THE

JOURNAL OF GAS LIGHTING.

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XV. No. 358—18th YEAR.] LONDON, JULY 10, 1866. [Subscription per Ann. { 15s. in Advance / 18s. Credit.] Price 8d. Unstamped.

RAMSAY'S CANNEL COAL.
Analysis by LEWIS THOMPSON, Esq.:—

Specific Gravity.	Cubic Feet.	Illuminating Power.
600	9151	5 feet per hour. = 27·2 candles.

RAMSAY'S PATENT CONDENSED COKE,
DO. GARESFIELD COKE.

RAMSAY'S FIRE-CLAY ARTICLES.
GAS-RETORTS, introduced 1828.
FIRE-BRICK WORKS, established 1804.
FIRE-CLAY SANITARY PIPES, CHIMNEY-TOPS, and all Goods made of Fire Clay.
The Fire Clay is worked from Blaydon Main Colliery, is of excellent quality, and no expense spared in perfecting every article.
The FIRE-BRICKS (marked "RAMSAY") are to be seen in all parts of the world, and the works are the most extensive in the Kingdom.
Manufactories: DERWENTHAUGH, SWALWELL, and HEBBURN QUAY. Offices: BROAD CHARE, NEWCASTLE-UPON-TYNE. Address, G. H. RAMSAY.

IMPROVED GASLIGHT.

Most of the complaints made of deficiency of gaslight, and bad gas, arise from the unskilful combustion of the gas, and especially from the employment of bad burners. The atmosphere is thus rendered offensive and unwholesome, and becomes charged with smoke—an inconvenience that is especially felt in *churches, theatres,* and *public offices.*
By using proper burners, regulating the pressure, and *carburetting* the gas, it will be rendered the cheapest and most wholesome artificial light that can be used.
CARLESS, BLAGDEN, and Co., having been for many years practically engaged in manufacturing every variety of substance used for the production of artificial light, have for some time specially directed their attention to the subject of *carburetting* gas.
In conjunction with GEO. GLOVER and Co., an extensive series of experiments have been conducted with the greatest care, and by means of instruments of the highest scientific precision; and the result of their united efforts is, that the fluid and apparatus have been so improved as to give a real commercial value to the process of *carburetting* common gas. The most important result to be obtained from this process is that the light can be *doubled or trebled,* and that for an equal amount of light the production of heat and carbonic acid gas will be greatly reduced, even to less than the quantity produced by wax candles and oil-lamps.
Messrs. GEO. GLOVER and Co. will have pleasure in showing the apparatus in use, and in giving any explanation that may be desired. Architects, engineers, and scientific men generally, are specially invited.
For list of prices, and all other information, apply to
GEO. GLOVER and CO.,
WORKS, RANELAGH ROAD, PIMLICO, S.W.; or,
CARLESS, BLAGDEN, and CO.,
2, NEW LONDON STREET, E.C.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, NEAR NEWCASTLE-ON-TYNE,
Were the only parties to whom a PRIZE MEDAL was awarded at the GREAT EXHIBITION of 1851, for "GAS RETORTS and OTHER OBJECTS in FIRE-CLAY," and they have also been awarded in the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for "GAS RETORTS, FIRE-BRICKS, &c., for EXCELLENCE of QUALITY."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts in the United Kingdom; and orders for Fire-Clay Retorts of all shapes and dimensions, Fire-Bricks, and every other article in Fire-Clay are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
Coal Office,
QUAY SIDE, NEWCASTLE-ON-TYNE.

FIRST PRIZE IN THE PARIS EXHIBITION.

JOHN RUSSELL AND CO.,
THE OLD TUBE WORKS,
CHURCH HILL, WEDNESBURY;
ALMA WORKS,
WALSALL, STAFFORDSHIRE;
and 69, UPPER THAMES STREET, LONDON,
Original Manufacturers of Wrought-Iron Gas Tubes and Holders of the present Patents; Inventors and First Makers of LAP-WELDED FLUES for Steam Boilers.
J. R. and Co. make all kinds of Tubes and Fittings for Gas, Steam, and Water, and the largest Orders may be executed in a few days.
Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.
N.B. All Goods thoroughly Tested before sent out, and Warranted.

THE MARQUIS OF LOTHIAN'S
CANNEL COAL.
This Cannel is extensively used in the Gas-Works of Edinburgh, and been so for Forty Years, and is well known to Gas Manufacturers throughout Scotland.
The yield per ton is 12,573 cubic feet, with an illuminating power equal to 33·8 standard sperm candles. Coke per ton by weight is 1046 lbs., by measure 26 bushels.
For price and other information, apply to Mr. JOHN ROMANS, Civil Engineer, 53, Frederick Street, EDINBURGH.

BLAYDON BURN AND LOW BENWELL FIRE CLAY RETORT AND FIRE-BRICK WORKS,
NEAR NEWCASTLE-ON-TYNE.
WILLIAM COCHRAN CARR begs most respectfully to thank the Metropolitan, Provincial, and Continental Gas Companies for their patronage for several years past, and to intimate that he has rebuilt and enlarged his extensive premises for the Manufacture of CLAY RETORTS; and that he is now prepared to execute the largest orders with punctuality and despatch. Orders for FIRE-CLAY RETORTS, of all shapes and sizes, FIRE-BRICKS, and all other Articles in Fire-Clay, executed on the shortest notice, and on the most reasonable terms.
London Agents: JAMES LAWRIE & CO.,
63, OLD BROAD STREET, CITY, LONDON.

CLEGG'S TREATISE ON
COAL GAS.
The Fourth Edition will be READY FOR DELIVERY at the end of the present week. Subscribers whose names have been sent to the Office of the JOURNAL OF GAS LIGHTING are requested to remit the amount of their subscription per Post Order, payable to WILLIAM B. KING, 11, Bolt Court, Fleet Street, LONDON.
If the Volume is required to be sent into the country, the subscription (15s.) should be accompanied with the further sum of 6d. to pay for securely packing and booking the same.
The price to Non-Subscribers is 21s.

WANTED, 2 Station-Meters and 2 GOVERNORS, second hand. The meters to pass from 400 to 1000 feet per hour. The governors, from 2000 to 3000 feet per hour.
Communications to be sent to Mr. ROMANS, Gas Engineer, 53, Frederick Street, EDINBURGH.

Established A.D. 1782. Prize Medal Holders.

WILLIAM BLEWS AND SONS,
9, 10, 11, and 12, NEW BARTHOLOMEW STREET,
BIRMINGHAM;
AND 38, WEST SMITHFIELD, LONDON;
PATENTEES AND MANUFACTURERS OF
METAL AND GLASS CHANDELIERS, &c.,
IN THE PUREST STYLE OF ART. Also of
IRON TUBES AND FITTINGS,
FOR GAS STEAM, AND WATER;
Steam and other Cocks in Gun-Metal and Brass; Stocks, Taps, and Dies; Gas-Hooks and Burners; Brass, Copper, and Composition Tubes; and every article required in the erection of Gas-Works.
ALL WARRANTED.

MEDAL AWARDED, EXHIBITION, 1862, "FOR GOOD WORK."
THE IMPERIAL TUBE COMPANY, BIRMINGHAM,
MANUFACTURERS OF
WROUGHT-IRON TUBES & FITTINGS, BRASS & COPPER TUBES,
GALVANIZED & GLASS ENAMELLED TUBES & FITTINGS,
LAP-WELDED IRON & BRASS BOILER-TUBES, ETC., ETC.
☞ Sole Makers of "HUGHES'S PATENT TAPS," Strongly recommended for all High-pressure purposes.—Price List and Testimonials forwarded on application.

THE UNVARYING WATER-LINE GAS-METER.
(SANDERS & DONOVAN'S PATENT.)
"Unquestionably the best Water Gas-Meter now in use."
MANUFACTURERS:
THE GAS-METER COMPANY, KINGSLAND ROAD, LONDON;
WITH
Branch Manufactories at DUBLIN and OLDHAM.

Now published, price 1s., per post 14 stamps, illustrated with various cuts,

THE GAS CONSUMER'S GUIDE.

By Wm. Richards, C.E.

Containing:—Progress of Artificial Light—Gas, its Manufacture and Quality—Advantages of Gas—Considerations on adopting Gas Lighting—On Burners, Flames, Glasses, &c.—The Proper Position for Gas-lights—Gas-Meters popularly explained—Index of Gas-Meters—Gas-Regulator—Ventilation—General Remarks.

To be had of the Author, 7, Regina Road, Upper Holloway, London.

RUTTER ON GAS LIGHTING.

Just Published, Fcap. 8vo., toned paper, pp. 71, sewed, price 6d.,

ADVANTAGES of GAS in PRIVATE HOUSES.

A Handy Book for Gas Consumers: telling them what to do, and what not to do.

By J. O. N. RUTTER, F.R.A.S.

A new and revised edition, and the 195th thousand.

London: Virtue Brothers and Co., 26, Ivy Lane, Paternoster Row, and all Booksellers. 1866.

For distribution by gas companies, the price is £12 12s. per 1000 copies, and £1 10s. per 100.

Crown 16mo, pp. 20,

GAS IN DWELLING-HOUSES: Its Uses, Conveniences, and Economy.

A revised and enlarged edition, and the 52nd thousand.

Price—1000 copies, £3 10s.; 500 copies, £1 17s. 6d.; any smaller number at 8s. 6d. per 100.

When 1000 copies are ordered, the official title, scale of prices, and other information relating to the business of the Company, will be printed on the covers without extra charge.

All orders and inquiries for the last-mentioned edition to be addressed to the Author, Black Rock, Brighton.

NOW READY,

VOL. XIV. of the JOURNAL of GAS LIGHTING, WATER SUPPLY, and SANITARY IMPROVEMENT, for 1865, price 21s., bound in cloth and lettered. A few copies of Vols. II., III., IV., V., VI., VII., VIII., IX., X., XI., XII., and XIII. are still on sale.

W. B. King, 11, Bolt Court, Fleet Street, E.C.

GAS LEGISLATION, 1866.

Now ready,

Reports of the Proceedings before Select Committees of Parliament.

ALDRINGTON, HOVE, AND BRIGHTON GAS, and **BRIGHTON AND HOVE GENERAL GAS BILLS**—price 2s., by post 2s. 1d.

SHEFFIELD UNITED GAS BILL—price 1s., by post 1s. 1d.

WANDSWORTH AND PUTNEY GAS BILL—price 1s., by post 1s. 1d.

IMPERIAL AND EQUITABLE GAS BILL—price 1s., by post 1s. 1d.

CHATHAM, ROCHESTER, &c., GAS BILL—price 1s., by post 1s. 1d.

London: William B. King, 11, Bolt Court, Fleet Street, E.C.

RATING OF GAS & WATER PIPES.

Now ready, price 2s., per post 2s. 1d.,

REPORT of the Appeal of the PHŒNIX GAS COMPANY *v.* LEE (West Kent Quarter Sessions, January, 1865), with the Special Case thereon, and Judgment of the Court of Queen's Bench.

London: William B. King, 11, Bolt Court, Fleet Street, E.C.

D. GRANT & CO.,

GAS-METER MANUFACTURERS

(Stamped according to the Sale of Gas Act).

STATION-METERS ANY SIZE.

PHOTOMETERS, EXPERIMENTAL METERS, PRESSURE-GAUGES, &c.

Price List on application.

GAS-METER WORKS, CROSSCAUSWAY, EDINBURGH.

TO INVENTORS AND PATENTEES.

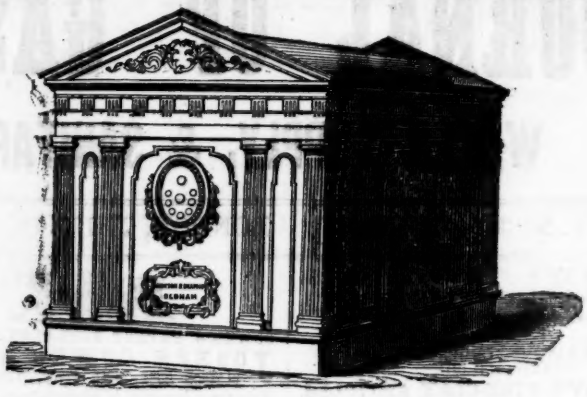
MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the advertiser, 42, Parliament Street, Westminster. [Office of the Journal of Gas Lighting, &c.]

GLOBE METER-WORKS.

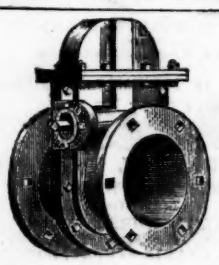


NEWTON & BRADDOCK,

MANUFACTURERS OF

STATION METERS, CONSUMERS METERS, &c.,

OLDHAM.



REDUCED PRICES OF

BRYAN DONKIN & CO.'S

IMPROVED GAS VALVES

WITH WROUGHT-IRON PINIONS

from 2 inches to 18 inches, price 9s. 6d. to 12s. per inch diameter

List of prices, with full dimensions of all sizes up to 36 inches, to be had on application.

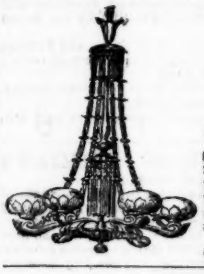
These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.

Valves made with Outside Racks to order. Also, Screw Water-Valves with Gun-Metal Faces.

BRYAN DONKIN & CO.,

ENGINEERS,

NEAR GRANGE ROAD, BERMONDSEY.



F. & C. OSLER,

45, OXFORD STREET, LONDON;

Manufactory—Broad Street, Birmingham—Established 1807,

MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards (Made from "Registered" Designs), with Glass Branches, &c.; suitable for Drawing-rooms and Ball-rooms. The more extensive use of Gas in private dwellings has induced Messrs. Osler to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

Theatres, Concert, Assembly, and Ball Rooms Lighted by Estimate on the Lowest Terms.

JOSEPH BOULTON,

80, KING'S CROSS ROAD, and

10½, GREAT PERCY STREET, CLERKENWELL.

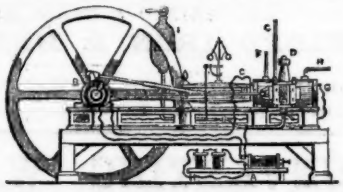
Manufacturer of the Patent Dry and Improved Unvarying Water-Line Gas-Meters and Station-Meters, Governors, Experimental Meters, and Pressure Gauges, on the most improved principle.

Old Meters thoroughly repaired, and altered to meet the requirements of the Act of Parliament.

ALL METERS WARRANTED.

FREEDOM FROM SMOKE.

POWER WITHOUT RISK.



THE GAS-ENGINE COMPANY,

LIMITED,

Beg to announce that they are ready to supply GAS-ENGINES of the following powers: half-horse power, one-horse power, two-horse power, three-horse power.

They are simple in construction, free from danger, and require no special attendant.

The Insurance Offices do not increase their rates, therefore the Engines can be used where steam would be inadmissible.

A large number are employed in London and provincial towns, for the purpose of sawing, pumping, working warehouse lifts, and driving all classes of machinery, such as printing-presses, soda-water machines, bottle-washing, hair-brushing, biscuit and confectionery machinery.

Prices and full particulars may be obtained either by post or personal inquiry, at the Office, 92, CANNON STREET, LONDON, E.C., and an Engine can be seen in work at the Factory, 4, VINE STREET, LAMBETH, S.

THE GAS-METER COMPANY

(LIMITED), LONDON,

(Successors to CROLL, RAIT, and CO., LONDON, and WEST and GREGSON, OLDHAM.)

MANUFACTURE

STATION-METERS & GOVERNORS

At their Oldham Establishment, which has long possessed the reputation of supplying this description of apparatus of the most perfect construction and appropriate design.

CONSUMERS GAS-METERS IN CAST-IRON & TINNED SHEET-IRON CASES.

STREET GOVERNORS, PRESSURE and EXHAUST REGISTERS, TEST GASHOLDERS,

AND EXPERIMENTAL GAS APPARATUS GENERALLY.

For information, &c., apply to

W. ARCHER, Manager, Meter Factory, OLDHAM;

OR TO

GEORGE RAIT, Managing Director, KINGSLAND ROAD, LONDON.

E. J. & J. PEARSON,

DELPH & TINTAM ABBEY FIRE-CLAY & BRICK-WORKS,

STOURBRIDGE,

PROPRIETORS OF

BEST GLASS-HOUSE POT & CRUCIBLE CLAY;

MANUFACTURERS OF

GLASS-HOUSE POTS, CRUCIBLES, GAS-RETORTS, & FIRE-BRICKS OF EVERY DESCRIPTION.

LLOYD AND LLOYD,

ALBION TUBE-WORKS, BIRMINGHAM,

MANUFACTURERS OF

WROUGHT-IRON TUBES & FITTINGS,

PLAIN, GALVANIZED, & ENAMELLED, for Gas, Steam, and Water, from ⅛ in. to 6 in. bore.

STOCKS, TAPS, and DIES, GUN METAL GLAND-COCKS, WATER-GAUGES, &c.;

PATENT LAP-WELDED IRON TUBES,

For Locomotive and Marine Boilers, &c.

LONDON WAREHOUSE—Nº 66, QUEEN STREET, E.C.

Established

1795.

JOSEPH CLIFF & SON,

THE ORIGINAL

WORTLEY FIRE-BRICK WORKS,

NEAR LEEDS,

MANUFACTURERS OF ALL DESCRIPTIONS OF

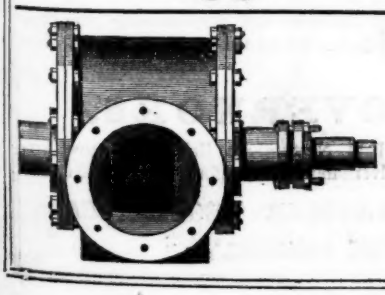
FIRE GOODS, and SALT-GLAZED DRAIN-PIPES.

LONDON AGENT:

MARCUS BOURNE NEWTON,

Wharf No. 4, inside Great Northern Goods Station, King's Cross

Where is always kept a Stock of Retorts, Fire-Bricks, Terra Cotta Ware, and Drain-Pipes.



ROTATORY AND DOUBLE-ACTING GAS-EXHAUSTERS,

with many recent improvements, from 1500 to 150,000 cubic feet per Hour.

JAMES BURTON, SONS, & WALLER,

MAKERS OF ENGINES, MACHINERY, and IRONWORK for GAS-WORKS,
efficient and durable TAR, LIQUOR, and SYPHON PUMPS,
GAS-VALVES, with or without Wedges, worked with powerful Worm and Rack,
SELF-ACTING BY-PASS VALVES, with Lid and Relieving Lever,
ROTATORY, TUMBLER, and CAPILLARY WATER DISTRIBUTORS for SCRUBBERS.
SMALL-SIZE EXHAUSTERS KEPT IN STOCK.

JOHN'S PLACE, HOLLAND STREET, SOUTHWARK, LONDON, S.E.

ANOTHER

MEDAL AWARDED BY THE JURY, INTERNATIONAL EXHIBITION,

1862,

To THOMAS GLOVER,

SUFFOLK STREET, CLERKENWELL GREEN, LONDON.

THOMAS GLOVER has great pleasure in informing Gas Companies and his other Patrons, that the *Jury of Class XXXI. of the International Exhibition of* 1862 have awarded, for his Patent Dry Gas-Meter, *a Prize Medal.* The reason given for this Award, in the Juries Official Report, is, "*For excellence of manufacture, as regards Dry Meters.*" See Official Report, p. 346.

It is worthy of remark, that the only two other Firms who receive Awards *both manufacture imitations of Thomas Glover's* Patent Dry Gas-Meter, and the reason given for these Awards is "*construction* and sound workmanship." Thomas Glover, therefore, claims that the *construction* of his Meter has obtained *three Awards from the Jury of the International Exhibition of* 1862; at the same time, *contrasting* the Award granted for his Meter by the words, "*For excellence of manufacture, as regards Dry-Meters.*"

The Prize Meter was exhibited in Class XXXI., No. 6301, connected with a 1-foot holder, to demonstrate that a 50-light Meter *measures and indicates accurately the small quantity of One Foot.*

WILLIAM PARKINSON AND CO.

(SUCCESSORS TO SAMUEL CROSLEY),

PATENT WET AND DRY GAS-METER MANUFACTURERS, &c.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

PATENT IMPROVED WET METER.

W. P. and Co. invite especial attention to this Meter, which entirely overcomes the difficulty to which ordinary Wet Meters are subjected, owing to the short range of the Float, which is necessary, in order to meet the requirements of the Sale of Gas Act.

"It is well known that n Meters constructed so that the valve will close when the water is drawn off to such a point as to render them 3 per cent. slow the lights are liable to be extinguished by the closing of the valve by a sudden increase of pressure. To meet this difficulty, Mr. Pinchbeck has invented an ingenious and simple arrangement by which the action is reversed, and any such increase of pressure, in his Meter, raises the value instead of depressing it. The fact of the improvement having been adopted by Messrs. W. Parkinson and Co. is a sufficient guarantee that it practically and effectually remedies the inconvenience it is designed to meet."—JOURNAL OF GAS LIGHTING.

PATENT IMPROVED DRY METER,

Which W. P. and Co. pledge themselves to manufacture with the same quality of materials and workmanship as in their Wet Meter, thereby giving Gas Companies and others the advantage of procuring a first-rate Dry as well as a Wet Meter, which, hitherto, they have been unable to do.

STATION-METERS AND GOVERNORS.

Which can be seen at all the London Gas-Works. Also Liverpool, Manchester, Sheffield, Nottingham, Belfast, Glasgow, Birmingham, Dublin, Bristol, Leeds, Leicester, Brighton, Southampton, Sunderland, Wolverhampton, Bradford, Norwich, &c., &c.

TEST GASHOLDERS, EXPERIMENTAL METERS, EXHAUSTER REGULATORS,

MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

CONTENTS.

	PAGE
Notes upon Passing Events:—	
The War in Germany	553
The New Commissioner of Public Works	553
Progress of the Thames Embankment	554
The Annual Report of the Society of Arts	554
Education amongst the Farmers	554
Finsbury Park	554
Young's History of Fires, Fire-Engines, and Fire Brigades	555
The Public Health Act Amendment Bill	555
Mr. Hawkshaw's Projected Tunnel across the Straits of Dover	555
Circular to Gas Companies:—	
Rejection of the Chartered Gas Company's Bill by the House of Lords	555
The Gas Question at Perth	556
The Royal Commission to Inquire into the Coal Question	556
Report on the Application of the Electric Light to Lighthouses	557
Richards's "Gas Consumer's Guide"	557
Correspondence:—	
British Association of Gas Managers	557
Register of New Patents:—	
Newton, A. V.—Apparatus for Generating Illuminating Gas	558
Brooke, E.—Deodorizing Noxious Gases from Sewers and Drains	558
Newton, W. E.—Engine, either a Motive or Pumping	558
Newton, A. V.—Decarbonizing Retorts	558
Hilliar, J.—Ventilating	558
Rigg, A.—Centrifugal Pumps and Fans	558
Cotterill, C. F.—Connexions for Pipes	558
Addenbrooke, J. and G., and Millward—Drawing Off Gases from Blast-Furnaces	559
Salisbury, S. C.—Producing and Combining Gases for Heating Purposes	559
Craig, A.—Apparatus for Extracting Oil from Coal, Shale, and other Minerals	559
Webster, J.—Gas-Meters	559
Brooman, R. A.—Rotary Engines and Pumps	559
Lee, T. V.—Candles from Peat and Petroleum	559
Cooke, W.—Sanitary Window-Fittings	559
Woodward, J. G.—Ventilating Apparatus	559
Abell, R.—Trapping and Ventilating Sewers	560
Parkes, J. J.—Gas-Lamps	560
Applications for Letters Patent	560
Grants of Provisional Protection	560
Notices to Proceed	560
Patents which have become Void	560
Parliamentary Intelligence:—	
Progress of Bills in House of Lords	560
Progress of Bills in House of Commons	562
Legal Intelligence:—	
Vice-Chancellor's Court—Fielden *v.* the Mayor and Corporation of Blackburn	562
Miscellaneous News:—	
How to Secure Cheap Gas for Perth	562
Boiler Incrustations	563
On the Mechanical Equivalent of Light	564
Professor Frankland's Analysis of the Metropolitan Waters, in June	564
Return by the Metropolitan Association of Medical Officers of Health of the Composition and Quality of the Metropolitan Waters, in June	565
Improvements in Gas-Lanterns	565
Dr. Hillier's Report on the Gas supplied by the Imperial Gas Company to the Vestry of St. Pancras during the month of June	565
Price Current	565
Share List of Metropolitan Gas Companies	565
Share List of Provincial Gas Companies	566
Share List of Water Companies	570

NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

The next number will be published on Tuesday, July 24, and the subsequent numbers on each successive alternate Tuesday.

This JOURNAL has been duly registered at the General Post Office for transmission abroad.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JULY 10, 1866.

Notes upon Passing Events.

ONCE it was the great commander—like the poet, born, not made—the eagle-eyed, rapidly-calculating man, who won battles; now the mechanic has the greatest share in victory. We did not feel this so much in the great American contest, where there were no elements of comparison, although the Americans have given us the revolver, and taught us to value Cowper Coles's turret-battery. Our military men learned there something of the way in which railroads can be used in war; but the distances were too great and the geography too little known for an ordinary European to understand the reports of Confederate and Federal victories. But this great German War for empire is being fought on ground familiar to our ever-wandering tourists, and famous in Continental History for the Thirty Years War, the Seven Years War between the North and South, and the wars in which France was alternately conqueror and conquered. In the Great Frederick's time weeks elapsed before authentic news of his alternate fortunes reached the coffee-house gossips of London, and it took days for the express announcing the result of the Battle of Austerlitz to reach and kill William Pitt. Now we learn the fortunes of each fight almost from hour to hour. The telegraph reduces to insignificance the endurance of couriers and the furious galloping of aides-de-camp. The struggle with each army is for railway communication, and locomotive trains take the place of the wonderful forced marches of the great captains of history. Again, it is only fourteen years since an exhibition took place which, amongst other fine things, was to be a festival of perpetual peace and goodwill. At that exhibition no implements of war were to be displayed, according to the original programme; for was not "the Empire Peace?" and had not the hatchet of conquest been solemnly buried? Two exceptions were made in compliment to the two most peaceably disposed nations on the earth—at least, so the Peace Society told us. The Prussians brought their last steel gun, and the United States their Colt's revolver—the first breech-loader that attracted the attention of real soldiers. Since 1852 the world has never been free from wars and rumours of wars, and a new generation of practical and theoretical professors of the art have arisen. Accomplished soldiers—French and English—who had learned their lessons in India, Africa, the Crimea, and Italy, were agreed on one point—that the Austrian army of 1866 was one of the most brilliant and perfect in all arms that had ever been brought together. Composed of warlike races, well drilled, well armed, according to the ideas of France and England; well clothed, well cared for; infinitely improved in every respect, and especially in artillery and small arms, from that army which the French had so much difficulty in defeating at Solferino. As for the Prussians—we repeat the talk of military clubs and officers high in the staff of the French army—they were good stuff, but too much interleavened with mild cow-keeping peasants and sons of decent tradesmen—too much an amateur militia army altogether. No one had any confidence in Prussian conquests, except it was the Prussians themselves, and they had no doubts. According to popular opinion, after a tough defence the white uniforms of Austria were to be quartered in Berlin, and "God preserve the Emperor" played "Under the Lindens." The Austrian army have fought as bravely as ever, but have been beaten in every serious encounter with the Prussians. They have been driven back from position to position until, on the 3rd and 4th of this month, came telegrams announcing on the first day the total defeat, and the next the rout of the great Austrian army, commanded by its best officers, after a pitched battle, in which the whole forces were engaged. Who won these battles, where both armies were so brave, both commanded by well-trained officers, and where the soldier-stuff was so evenly matched? The mechanic won it! The breech-loader and steel artillery, but especially the breech-loader, in the hands of the calm, cold, obedient men of the north—firing five to one, and, what is more, killing five to one (six to one, according to the *Times* report of one action)—the Prussian advance was irresistible. What a disgrace it will be if we—not only the first mechanics in the world, but with more workshops open than any country in the world—lose a year without arming our troops and navy in every part of the world with a better breech-loader than has now given the empire of North Germany to the Prussians. According to Paris gossip, the Emperor of the French was to have moved from Nancy to the Rhine this autumn. Will he march at once, while Prussia is still hard at work, or wait a year, until he has re-established equality of small arms armament?

With a new Government we have a new Commissioner of Public Works, new theories, new plans, and a desire to rival

the predecessor and leave some mark on the metropolis during a reign which the ordinary political prophets put down at only six months. They may be as much mistaken as about Prussian armies. By this rivalry and change the public will certainly gain; tenants at will are proverbially civil as well as liberal in spending their landlord's money. Mr. William Cowper has done the gardening of the parks extremely well, and made that department easy for his successor; but there are other matters connected with his office in which new views, new advisers, and new architects, will be found useful to the public.

The Thames Embankment at Westminster is so far advanced that an idea may be formed of its general effect. The improvement is so magnificent that London must be thankful, and so ought the Duke of Buccleuch. But architecturally the design seems thin and poor, and the ornaments not on sufficiently grandiose a scale for so great a space. To make that part of Westminster complete, Great George Street ought to be rebuilt—if not all at once, at any rate under the control of one architect—so as to secure a vista from Westminster Bridge worthy of the situation. With this idea in view, we trust that a sufficient number of public-spirited subscribers will be found to carry out the project for building an Institution of Civil Engineers fit for that learned and wealthy society, with rooms affording facility for reading and discussing papers, and a library for collecting books, displaying drawings, and last, although not least, for that social intercourse so important in an essentially communicative profession. All the learned professions have their halls, their libraries, their lecture-rooms. The lawyers for centuries have been visibly represented in their Inns of Court, and have within the last half of this century launched out liberally in architectural decoration. The physicians and surgeons have their London colleges. The clubs of military men are amongst the principal ornaments of club-land. Without asserting that engineers make as much money as the lawyers, they certainly make more than doctors or soldiers. The promoters of the scheme may calculate that each future batch of successful presidents and vice-presidents will embalm his name as a contributor to the building-fund. The present building is quite unworthy of a profession which has so large a share in the progress of the civilized world. A building on a suitable scale might include as a *succursale* a club, to which a large class of men indirectly connected with engineering work and consequent parliamentary contests would be proud to belong. In this way the large amount of business not strictly professional which a leading engineer must do would be greatly facilitated. Objections have been whispered that the society is in arrear with its "Transactions," and that until these are all published punctually it is an extravagance to think of a fine building. But this is a very cheese-paring view of the subject. In the first place, the delay in publishing "Transactions" is not in the least a matter of money. It is the system of the society to submit all the discussions to a rigid censorship. As there is only one censor, and he has other fish to fry, it takes time to reduce the various speeches to one even level of dull respectability. In the next place, when a profession is flourishing, and when numbers join the society for the honour's sake, a fine building increases income, and adds to the general business. The Athenæum began with a large building debt, contracted with an insurance company. The economical principles which enable shopkeepers to make fortunes, and private gentlemen to save fortunes out of income, are not the principles on which institutions like that of the M.I.C.E. flourish.

The Society of Arts, which owes its great and deserved success to the skill with which its officers combine a little learning with a good deal of amusement, has issued an annual report. It is an ingenious attempt to make out its exceeding utility. The paragraphs about the prizes offered by or through the Society must have puzzled the reporter very much, as he has to admit that neither money nor medals have produced any result. Prizes offered for preserving meat in a raw state, and for turning peat into fuel equal to household coal, and cheaper than coal, have not been awarded for want of merit. As the discovery of either would have been worth at least £100,000 to the inventor, it is not surprising that £50 did not procure the desired results. However, a Mr. Bosisto did earn a prize for importing as a regular article of commerce the essential oil of the Australian gum-tree (*Eucolyptus*). It does not appear that he was tempted into the speculation by the silver medal of the Society. The "Art Workmanship" prizes have been a failure. The Albert gold medal, for distinguished merit in promoting "arts, "manufactures, or commerce," has been awarded to Professor Faraday. No one could be more worthy, but whether so distinguished a man will consider the award any honour may be doubted. These medals, which are not worn except by one hack writer, which cannot be framed, and are only of value when awarded for specific merit by a competent society, always remind us of that manager in one of Douglas Jerrold's stories, who, when arranging for the usual shower of bouquets at his benefit, asked the purveyor to add something useful—"a pine-apple, or a melon," (it was before the days of pine-apples at a penny a slice). To these luxuries the greengrocer-gardener demurred, but offered to throw in a few bunches of greens and carrots, or even a cucumber. Now, could not the Society of Arts do something of the kind, and try the effect of their invention—"Art Manufacture" prizes in the shape of ear-rings for the girls, watch-chains for the boys, and a tea-pot or tankard of an original design for their maturer competitors. It is a significant fact that the authorities of Guy's Hospital have discontinued offering prizes because they consider that the general education of pupils is injured by too exclusive attention to single prize-winning subjects.

The Musical Education Committee of the Society appears to have been cleverly timed. The Royal Academy has received notice to quit the premises it has occupied in Hanover Square since its foundation, and will probably be glad to accept the shelter offered at South Kensington, close to the music-hall, for the building-fund of which an active canvass is being carried out in the world of fashionable and would-be-fashionable people. The walls of London are often placarded with the question, "Where to spend a happy day?" In a very few years the answer must be, "At South Kensington." For, with galleries of pictures and museum of arts and manufactures, the Horticultural Gardens and the Natural History collection from Bloomsbury, a capital restaurant, and concerts by the pupils of the Royal Academy, besides the attractions of Hyde Park, who can desire more; "grave and gay, lively and "severe," will be suited. The promoters of the Crystal Palace must see now that they made a great mistake when they left Mr. Henry Cole out in the cold. With his cheap and ever-changing attractions even the indefatigable Bowley cannot successfully contend.

The Royal Agricultural Society has been paying a good deal of attention to schemes for promoting education amongst farmers. The essays on the subject fill a large space in the last number of the journal. As a matter of course the theorists ride their hobbies very hard, but there seems a general gravitation to common sense. The difficulty of improving agricultural education is great. Few farmers can afford to send their sons far from home; good schools are rare, especially middle-class schools, and, when the education has been obtained, it is often lost for want of access to books. Those who live in the open air and in the country find the pipe and the early to bed or the doze in the chair as formidable rivals to study as the gun and the hunter. One of the best essays is by the Rev. Holt Beevor, and he gives an excellent rule for the hours of teaching: to begin work at half-past six and finish at three p.m., when the boys should dine, having had bread and butter at half-past twelve; thus completely dividing work from play—no heavy lessons after a hearty dinner. This is sound sense.

We are glad to see that the common sense of the Metropolitan Board was too much for the popularity-seeking claptrap nonsense of a minority in the matter of what by a geographical fiction is called Finsbury Park. This site of old Hornsey Wood House will be very accessible, and a great boon to many parts of the town, but might with much greater propriety be called Holloway Park or Camden Park than Finsbury. Hornsey Wood conveying an old association, would have been better than any other name; but as London wants a good many open spaces and must pay for them, unless the ratepayers prefer setting up precedents of confiscation, the Metropolitan Board is wise in going economically to work, and trying to get some reproductive return out of their investments. The fight turned on whether or not the Board should let twenty acres of land for building villas, leaving a park nearly as big as St. James's and Green Park joined together. The minority was comprised of those parish orators who are the first to support some wretched twopence-halfpenny economy. There is Hampstead Heath being legally

spoiled by the lord of the manor, because the parochial legislators will not listen to a reasonable compromise, and yet to a compromise it must come at last.

Mr. Charles Young, C.E., has lately published a book on "Fires, Fire-Engines, and Fire Brigades, with a History of "Manual and Steam Fire-Engines," which contains, we believe, the latest information on all these important subjects, and is made specially useful by a good index. Chapter 1 is devoted to fires and the means of preventing them; chapter 2 gives a chronological list of the most remarkable fires; chapter 3 contains the history of British Fire Brigade establishments, and argues their inadequacy; chapter 4 treats on the means of extinguishing fires; chapter 5 describes fire-proof structures; chapters 6 to 9 are devoted to the description and history of fire-engines; chapters 10 to 14, to steam fire-engines. Other chapters examine critically the means available for extinguishing fires in the chief towns of Great Britain; describe the London Fire Brigade Act Establishment, and make suggestions for further improvements in every branch connected with the dangers of fires. This work is full of interesting and useful information on a subject hitherto untouched. On a future occasion we may make some extracts from it.

Amongst the Bills hung up by the change of Ministry is the Public Health Bill (introduced by Mr. Bruce, Mr. Chichester Fortescue, and Sir George Grey), after it had been seriously amended by the select committee, and contains some very important clauses. "Sewer authorities" may provide a supply of water for the inhabitants of a district by, first, digging wells; second, by making reservoirs; third, or any other necessary act. A justice of the peace on complaint may issue a summons compelling sewer authorities to appear before the petty sessions, and answer for not supplying water to a district, and petty sessions may make and enforce such orders with costs. In Part II., relating to amendment of Nuisances Removal Act, a requisition in writing of ten inhabitants of a place is made equivalent to the certificate of a medical officer. By clause 29, nuisance authorities have power to maintain carriages suitable for the conveyance of persons suffering under contagious or infectious diseases. By clause 30, nuisance authorities may provide places for the reception of dead bodies at public expense. In Part III., under clause 36, a penalty may be imposed on any person with an infectious disease exposing himself, or any driver of a public conveyance who does not disinfect the vehicle which has conveyed any sufferer, or any person who exposes clothing, rags, or other things which have been exposed to infection from any disorder. By clause 37 a penalty is imposed on any person who lets any house, room, or part of a house, in which any infected person has lodged. These are important and highly useful propositions, which it is to be hoped will pass into law before the Parliament rises for its long vacation.

The daily papers are giving importance to schemes for more closely uniting the railway systems of England and the Continent. The often-talked-of tunnel scheme between Dover and Calais has been endorsed by Mr. Hawkshaw—certainly an engineering authority, who has a well-founded reputation for practical talent. But he estimates the time for executing a tunnel at twenty years, and the cost at twenty millions sterling. Mr. John Fowler, the rival nearest the throne of Mr. Hawkshaw, has a cheaper plan. He adheres to the idea of his youthful days, when scheming to cross the Humber, and has designed steam ferry-boats of gigantic size, to be accommodated in docks specially built for the purpose on either side of the Straits. On each of these ferry-boats a whole train is to be accommodated, and passengers are to be secure from seasickness. The cost is estimated at two millions and a half—say five; and before finance companies came to grief there would have been no difficulty, as far as money went. As it is, unless a Government subsidy can be obtained, we suspect that for ten years the inter-continental passengers must endure the miseries of the sea for 100 minutes. We confess that, looking at the traffic, as far as passengers are concerned, we see nothing to justify the expense of a tunnel. Double the passenger traffic, and it is still insignificant. As to merchandise, there is a stronger case. To be able to receive trains from Marseilles, Berlin, Vienna, Trieste, Genoa, and all the intermediate manufacturing centres—to load cattle in Gallicia or Hungary, and deliver them in London, is a grand idea; but Mr. Fowler's scheme would do nothing for it. Will France and England each agree to pay half a million a year for twenty years for the tunnel? If they will, the scheme will certainly be launched by the financial strength of the coast railways; for the amalgamation of the Brighton with the Dover lines is only a matter of time and a little change in the governing powers.

Circular to Gas Companies.

The rejection of the Chartered Gas Company's Bill by the House of Lords, on the question of the second reading, by a majority of one, is a very untoward event, and shows how the decision of matters of grave importance often depends on a single vote. Twenty-seven peers, including six bishops, voted against the Bill, and twenty-six for it. The opposition was organized by the City authorities, who put forward a series of "reasons" against the Bill, which were endorsed by the Remembrancer, in explanation of those objections. These "reasons," which comprised several fallacies, were founded principally on objections to the site of the proposed new works, and also on the ground that if the amalgamation of the two companies were effected, and their works were concentrated on the new site, that arrangement would interfere with the project of the corporation, to be brought forward next year, for taking the gas supply of the City into their own hands. The first of the "reasons" asserts, in opposition to the committee of the House of Commons, that a far better site could be obtained; and the spot selected by the corporation at West Ham for their proposed gas-works is asserted to be "perfectly "eligible," though the objections raised against it in the committee were much stronger than those urged against the site near Victoria Park. Among other recommendations of West Ham, it is stated to be favourable for the working up and disposal of the residual products, though the fact is, that it would be a difficult matter to dispose of the coke in that locality. The words of the chairman, that "the committee are satisfied "with the site," are set forth in large type, while it is attempted to disparage the similar decision respecting the site near Victoria Park, by representing that "it was so approved "merely on a visit of some of the members of the committee "with persons to point out its advantages, but with no one "present to point out the objections to it." That assertion is untrue; for representatives of the local authorities were present on the occasion, and the City authorities were invited, but refused to attend. In concluding their "reasons" against the Bill the Corporation appeal to the sympathies of the House of Peers, and express the hope that they "will not sanction "the *destruction* of so beautiful a spot as Victoria Park." It could scarcely have been expected that the Corporation of the City of London would have sanctioned such a wild assertion that the erection of gas-works at a distance of half a mile would *destroy* the park, in defiance of the well-known fact that the trees in St. James's Park flourish within half that distance of one of the largest gas-works in London. The violent advocates for the preservation of the beauties of Victoria Park confined their objections to the Bill to the probable prospective depreciation of the beauty of the flowers and the shrubs; it remained for the extreme sensibility of the Corporation, in their new-born sympathies for the public, to apprehend that the gas-works might altogether destroy such a source of happiness to the working classes, towards whom they had not previously been remarkable for the display of kind consideration. The debate on the second reading of the Bill, a report of which will be found in another column, was opened by Earl Nelson, who moved that it be read a third time that day three months, on the ground that the erection of gas-works so near to Victoria Park would be a serious injury to the health, happiness, and moral character of the people in that part of the metropolis. Similar objections to the Bill were urged by Lord Brougham, Lord Teynham, Earl Beauchamp, the Bishop of London, the Marquis Townshend, and the Earl of Carnarvon, most of whom are only distinguished by their display of maudlin sympathy with "the working man," and who have been made dupes by the Corporation in this matter. Those who supported the second reading contended that it ought not to be rejected without hearing evidence against it, and among the speakers on its behalf were the then Lord Chancellor, Lord Chelmsford (the present Lord Chancellor), the Earl of Caithness, Lord Overstone, and Lord Redesdale, all men of the highest character in the House for ability and statesmanlike qualities. The Archbishop of York and the Bishops of Peterborough and of St. David's voted for the Bill, but the Bishop of London, who is leader of the pre-

latic crusade against gas-works, was backed by five other bishops, and succeeded in overpowering the good sense and sound judgment of the House. Practical common sense is not a quality for which the Bench of Bishops are distinguished, nor does it seem very clear why they should so far depart from their appropriate vocations as to march down to the House of Lords, at the beat of the drum of the Bishop of London, to vote against the amalgamation of two gas companies. This combination of prelates to interfere in secular matters of which they can have no knowledge, may suggest to laymen that they would be equally justified in combining to prevent subscriptions to the fund the Bishop of London is raising for the erection of churches and schools, on the ground that they may become so many nurseries of semi-popish dectrines, and as dangerous to the true Protestant faith of this country as the proposed gas-works at Hackney Wick seem to the bishop and his followers to be dangerous to the growth of trees and flowers in Victoria Park.

This decision of the House of Lords has unquestionably placed not only the Chartered Company, but all the metropolitan gas companies, in a position of great difficulty; for while on the one hand they are under obligations to supply all the gas that may be demanded, they are, on the other hand, denied the proper means of doing so. To compel the gas companies to expend more money in the extension of works on sites which, in deference to public opinion, they were willing to abandon, is as inexpedient as it is unjust; and those who force them to do it, on the fanciful idea that injury might be done to the inhabitants of the eastern district of the metropolis by damaging vegetation at a distance of half a mile, will have committed substantial injury on the whole population of London by preventing reductions in the price of gas. Before taking so summary a step as the rejection of the Bill on the second reading, some preliminary inquiries as to the truth of the allegations of its opponents should surely have been taken; for, as Lord Overstone properly observed, it was unreasonable and unjust that they should throw out a Bill without inquiry which had been passed by the other House. Three courses are now open to the gas companies of the metropolis to take, viz.:—To continue their present organization, and by that means allow themselves to be sacrificed in detail; to amalgamate in a similar manner to the fusion of the Paris gas companies, and by a rearrangement of districts reduce the new works to the lowest possible limits; or, lastly, to sell their several undertakings to the Metropolitan Board of Works on such terms as may be mutually agreed. They have only a few months to determine what course they will adopt in the present crisis of their affairs, and they will do well in the interval to make an effort to enlighten the public mind on the question of gas supply, and to endeavour to remove, by the agency of the press, the delusions now prevalent on the subject. The gas consumers of London are not so obstinate as to refuse to be guided by common sense, nor are they so obtuse as not to be able to comprehend the real merits of the case if it be clearly set before them,

The active competition for the supply of gas which has existed for the last five years in Perth is about to come to a disastrous end. Some of the gas consumers in that city were induced by the eloquence of Mr. Flintoff to start a consumers company for the supply of gas at 5s. per 1000 feet, the charge of the old company having been 7s. 6d. The directors of the old company, finding that they were losing their customers, adopted the bold resolve of reducing their price to 4s. 2d. per 1000 feet; and by that means they so effectually put a stop to the progress of their rivals, that after a sharp competition of eight months the latter were unable to pay any dividend. The old company at the same time paid a dividend of 3 per cent. A similar state of affairs has continued to the present time. The dividends of the old company have been gradually raised to 5 per cent., while their rivals have paid none during the last five years. Nevertheless, the new company, as a last act of desperation, reduced their price at the beginning of the year to 4s. 2d. per 1000 feet, so as to be on the same level as the old company. That desperate measure has, however, only plunged them further into difficulty, and the proprietors are not only without dividends, but they are out of pocket for payment of current expenses. This is the existing state of the gas question at Perth; and the future prospect—as stated in an article quoted elsewhere from a local paper—is, that the new company will be starved out of existence, and that the price may be "raised to the old familiar figure of 7s. 6d. per "1000 feet." Such have been the results of competition in Perth, where those who were so far misled as to follow the advice of Mr. Flintoff have cause to regret that he ever visited their fair city. The competition between the gas companies at Perth is likely to end more fatally to the competing company than in the celebrated contest at Whitehaven, where, after a struggle of several years between the old and new companies, at prices of 2s. and 2s. 6d. per 1000 respectively, an arrangement was agreed to by which the price was raised to 3s. 4d. to general consumers, and the public lighting was divided between them. At Whitehaven, as at Perth, the new company had not paid any dividends, and had become quite exhausted.

It is announced in the *London Gazette* that the Queen has appointed the Duke of Argyll, Sir Roderick Impey Murchison, Sir William George Armstrong; Henry Hussey Vivian, Esq.; George Thomas Clarke, Esq.; Joseph Dickinson, Esq.; George Elliot, Esq.; Thomas Emerson Forster, Esq.; John Geddes, Esq.; Robert Hunt, Esq.; John Beete Jukes, Esq.; John Hartley, Esq.; John Percy, Esq., Doctor of Medicine; Joseph Prestwich, Esq.; Andrew Crombie Ramsay, Esq.; and John Thomas Woodhouse, Esq., to be Her Majesty's commissioners to investigate the probable quantity of coal contained in the coalfields of the United Kingdom, and to report on the quantity of such coal which may be reasonably expected to be available for use; whether it is probable that coal exists at workable depths under the Permian, new red sandstone, and other superincumbent strata; to inquire as to the quantity of coal at present consumed in the various branches of manufacture, for steam navigation, and for domestic purposes, as well as the quantity exported, and how far, and to what extent, such consumption and export may be expected to increase; and whether there is reason to believe that coal is wasted either by bad working or by carelessness or neglect of proper appliances for its economical consumption. Of the four branches of inquiry which the commissioners are required to undertake, the first one—as to the probable quantity of coal available for use in the known coalfields of the United Kingdom—is of the most practical importance, and it is highly desirable to have some definite information on the subject, respecting which opinions so widely differ. The value of the report on that point will, however, depend on the extent and impartiality with which the inquiry is conducted. To render the commission of real service as a guide to legislation, if such a course be contemplated, the investigation must be a searching one, and unbiassed as much as possible by preconceived opinions. The second branch of the inquiry—whether it is probable that coal exists at workable depths under the new red sandstone—is a geological and speculative question, on which no definite information can be expected. It seems highly probable, indeed, from the generally regular succession in the geological series of rock formations, which in England crop out on passing across the country from Suffolk to Wales, that the coal measures underlie the tertiary and secondary strata in the eastern counties. Of the depth at which coal might be found there some estimate may be formed from the known average thickness of the clay, chalk, sand, and oolites which comprise the upper geological systems. Underneath London, for instance, there is about 300 feet of clay before the chalk is reached; the thickness of the chalk is estimated to be 800 feet; then there occur 500 feet of green sand; next the Wealdon beds, of 900 feet; the oolites, intermingled with clays, have a thickness of 1500 feet; then there are about 100 feet of lias; and, lastly, 1200 feet of new red sandstone and magnesian limestone must be penetrated; making altogether a depth of 5300 feet before the coal would be reached. But if a shaft were sunk at some place farther westward, where the new red sandstone begins to crop out, the coal measures might be arrived at by sinking to a depth of 1200 feet. It is possible, therefore—assuming the geological series to be continuous—to find coal at variable depths under the strata in all parts of England, with the exception of Cornwall, in which county and in Wales the rocks underlying the coal measures come to the surface. Whether the coal lying at such great depths can ever be made available must depend entirely on improvements in the mode of working which scientific discovery and mechanical ingenuity may effect. The third branch of the inquiry relates to the quantity of coal at present consumed, and the extent to which the consumption may be expected to increase; and it is somewhat remarkable that among the commissioners there is no person to represent the interests of the largest class of consumers of coal, the gas companies of the

United Kingdom, who consume about one-fifth part of all the coal that is raised.

It appears from a parliamentary paper just issued, relative to the application of the electric light to lighthouses, that the practical difficulties attending it have not yet been overcome. The paper in question contains copies of correspondence between the Board of Trade, the Lighthouse Boards, and various persons, from June, 1863, to April, 1866, with reports of Professor Faraday and others on the respective merits of the arrangements contrived by Professor Holmes and by M. Berlioz, of Paris, and on the results of their applications at Dungeness and at Cape La Hève. A tabular statement is given of the results of the working of the electric light at Dungeness from June, 1863, to December, 1864, noting the number of times that the light went out, the length of time it continued extinguished, and the cause of the defect when ascertained. This statement is sufficient to show that the effective operation of the electric light as at present arranged cannot be depended on. In many of the instances reported the light was extinguished for only a few minutes, but in some cases it ceased to operate for several hours, and the oil-lamp apparatus, which was kept in reserve, had to be lighted. The failures of the light are reported to have been of such frequent occurrence as to extend in the aggregate to a period of 119½ hours during the year and a half. The causes of these failures of the light are very instructive, as they show the various casualties to which the electric light is subjected, for it has to depend on the continued and regular action of the steam-engine required to keep the magnets in rotation, as well as on the perfect operation of the electrical apparatus, and the watchfulness of the persons in charge. Most of the causes of the cessation of the light are, indeed, attributed to the defective working of the engine, in consequence of want of draught in the furnace, or want of steam, and one from the supply of water running short. As regards the electrical apparatus, the most frequent cause of defect was the condition of the carbons, which either broke off, fell out of the clams, or came in contact. In one instance the failure of the light was attributed to the keeper having fallen asleep, and in another the light went out because he had inadvertently left his spectacles on the lamp. Though the tabular statement published does not extend beyond the year 1864, the reports appear to have been continued with similar results to the present time, and it is reported that there was a total cessation of light for 15 minutes during the night of the 15th of February last, again owing to the drowsiness of the man in charge. This liability to the interruption of the light is a serious drawback to the efficiency of the electric light for lighthouse purposes, and in the last letter from the secretary of the Trinity House to the secretary of the Board of Trade, in reference to the effect of the man sleeping on his watch, it is stated that "the Elder Brethren "have used, and will continue to use, every endeavour to "render the electric light as efficient as possible; but they "cannot conceal from themselves, and would desire to impress "upon their lordships, their conviction that cases like the "present are not unlikely to recur, and that this liability is a "matter for grave consideration in respect of the development "of the magneto-electric light as an element of lighthouse "illumination." With respect to the quality of the light itself, the observations of the one at Dungeness show that, though vastly superior in brilliancy to the oil-lamps, when near, the superiority diminishes at a distance, and at 15 miles off there is not much difference. There is supposed, however, to have been a defect in the lenses applied to the electric light, and the reports of the lighthouse at Cape La Hève, where the apparatus of M. Berlioz is used, are much more favourable. In his arrrangement the bobbins rotate instead of the magnets, and there is no commutator, both of which deviations from the arrangements of Professor Holmes are said by Professor Faraday to be considerable improvements. The Elder Brethren, however, do not propose to adopt the arrangement of M. Berlioz, "which they believe would be a "national discredit, and an act of injustice to Professor "Holmes, to whom is due the invention of the means of "applying Professor Faraday's discovery to lighthouse "purposes;" and it is stated that Mr. Holmes has made improvements which make his apparatus equal if not superior to the French lamp. The Commissioners of Northern Lighthouses have also made arrangements to try certain improvements alleged to have been effected by Messrs. Wilde and Co., and to compare their apparatus with that of Mr. Holmes, one of the recent improvements being an adaptation of the power of the steam-engine to various requirements of the apparatus in different states of the atmosphere. One practical obstacle to the application of the magneto-electric light on rocky isolated positions is the difficulty of procuring fresh water for the steam-engines; water, it is observed, being as essential to the magneto-electric light as oil is to the lights now in use. As a means of overcoming the difficulty, it is proposed to transmit the electricity through thick wires from more convenient stations on the mainland, it having been ascertained by recent experiments that there is practically no loss of light by the transmission of the magneto-electric currents through a length of "high conductivity" wire of large size extending 600 yards from the machine. This proposition of transmitting electricity through an insulated wire to lighthouses at a distance is suggestive of a plan for supplying them with gas, which might probably be done quite as effectually and much more reliably than they could be supplied with electricity. It is clear, from the correspondence and reports now published, that the electric light has hitherto failed to accomplish the object for which it was considered especially adapted. Though much more brilliant than the oil-lamp, its rays, at short distances, are so dazzling as to become perplexing, and the continuance of the light cannot be depended on. Were gas supplied through two separate mains, in case of accident to either, a light far superior to that of oil would be always at command, which might be increased in power when the state of the atmosphere required greater penetration.

A little book, entitled "The Gas Consumer's Guide," by Mr. W. Richards, has just been published. It will be of great service to the numerous class of the consumers of gas who know nothing about its properties, or how to burn it to the best advantage. The chapter on burners and flames will be found particularly useful, as it points out very clearly the great loss of light that is occasioned by the application of unsuitable burners, by high pressure, and improper regulation of the flame; and the subject is well illustrated by many wood engravings. The want of such a work for the general information of gas consumers is frequently felt, and this little work, which from its price is accessible to all, seems well adapted to supply what was required.

Correspondence.

BRITISH ASSOCIATION OF GAS MANAGERS.

Sir,—Your report of my remarks upon the lighting of Portsmouth floating bridge implies that Messrs. Hulett originated the plan. Such was not the case; but this company, in September, 1857, obtained a price for the gasholder from Messrs. Paddon and Ford, and offered to do the whole work. Subsequently, Messrs. Hulett, while fitting up the model barracks here, agreed to do the holder and fittings, and this company the service and connexions, as detailed in the Journal of Gas Lighting, vol. viii., p. 172. I ought to state that Messrs. Hulett deservedly received high praise for their very satisfactory execution of the above works.

On the subject of photometry, I would give the result of my experience, which will doubtless agree with that of others, in the following propositions:—

1. Length or height of flame is not a true measure of illuminating power.
2. Size or diameter of orifice with velocity of gas is not a true measure of illuminating power.
3. Intensity of shadow is a true measure of illuminating power, and as the power of illumination so is the intensity of shadow.

My desire to state the matter clearly will, I hope, obtain the favour of insertion.

Gosport, July 6, 1866. G. B. Irons.

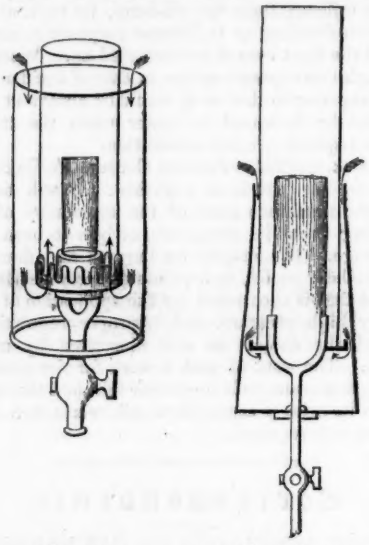
Sir,—I am afraid I unwittingly did injustice to Dr. Frankland, when, in my lecture "On the Combustion of Gas for Economic Purposes," I spoke of the hot-air burner as having been "originally designed by Mr. Bowditch, and somewhat modified by Dr. Frankland;"* for it appears, from information which I have received from Dr. Frankland, that he never heard of Mr. Bowditch's invention until he saw the account of it in my lecture. I am, therefore, anxious to set the matter right, and to say how I came to mistake the facts.

In the year 1853 or 1854 I received from Mr. Bowditch one of his hot-air burners; and in the summer of 1855 I wrote a description of it for a work I was then preparing, "On the Chemistry of Artificial Light." The work was hastily written, and was published anonymously, in 1856, by Messrs. Orr and Co., in

* Journal of Gas Lighting, June 12, p. 498.

their "Circle of the Sciences." * At page 27 of the work I thus described the invention: "The Rev. Mr. Bowditch, of Wakefield, has contrived an apparatus whereby this (the heating of the air) may be effected in the case of common gas. He places a disc of metal, or a cup of glass, having a hole in its centre, upon the screw which receives the burner. This disc or cup is made the means of supporting an outer glass, and thus of directing the air down over the surface of the hot chimney before it enters the flame from below (fig. 5). It is stated that the light is increased about 25 per cent. by this arrangement." In the early part of 1861, I saw for the first time the account of Dr. Frankland's double cylinder gas burner; and as the drawing of it was somewhat different from the drawing which I had given of Mr. Bowditch's contrivance, I erroneously thought that it was a modification of Mr. Bowditch's. This error I am anxious to correct, by saying that there cannot be a doubt of Dr. Frankland having originated the invention, without any knowledge of what Mr. Bowditch had done, for he informs me that he showed it to many friends at Manchester early in the year 1854, and that he has described it in his lectures at Owen's College, Manchester, and at St. Bartholomew's Hospital, and at the London, and the Royal Institution of London for years past.

It would seem, therefore, that the arrangement was designed about the same time by both Dr. Frankland and Mr. Bowditch,



BOWDITCH. FRANKLAND.

and that the invention was original in each case. I append the drawings of the two contrivances, in order that their differences may be seen.

College Laboratory, London Hospital, June 27, 1866. H. LETHEBY.

Register of New Patents.

2439.—ALFRED VINCENT NEWTON, of 66, Chancery Lane, London, mechanical draughtsman, for "*Improved apparatus for generating illuminating gas.*" A communication. Patent dated Sept. 23, 1865.

This invention relates to that class of gas generating apparatus in which the illuminating gas is produced by the passage of currents of atmospheric air over and in contact with naphtha or other similar hydrocarbon oils, whereby the air becomes carburetted or surcharged with the volatile portions of the naphtha, and may then be used for illuminating or heating purposes substantially in the same manner that ordinary gas is used. All apparatus of this class have heretofore been constructed and arranged upon the erroneous theory that the inflammable carburetted air produced in the manner above described is of a less specific gravity than the atmospheric air.

This invention is founded upon the theory and discovery that the specific gravity of the carburetted air is greater than that of the ordinary air, and consists in so arranging or placing the carburetting apparatus above the point of combustion that the carburetted air falls down to such point by its own weight, creating a vacuum in the apparatus, and thereby inducing the air into the same and producing the requisite current automatically without the aid of any mechanical appliance for that purpose.

2451.—EDWARD BROOKE the younger, of Huddersfield, Yorkshire, manufacturer of sanitary tubes and other fire-clay goods, for "*An improved arrangement of apparatus and materials to be employed for effecting the deodorizing of the noxious gases arising from sewers and drains, and for the more effectual ventilation and inspection of such sewers and drains.*" Patent dated Sept. 25, 1865.

A tube or pipe of earthenware or other material is provided, one end being of form and dimensions to fit into the socket of ordinary sewer or drain pipes, the other end being enlarged and provided with a socket and shoulder, in and on which rests a tray or screen of galvanized iron (or other material), which tray or screen is covered with charcoal or other deodorizing medium. The portion of the socket or shoulder above the tray or screen and charcoal is perforated with a number of openings, through which the air and gases pass after being deodorized by passing through the charcoal, and thence escape by a grate placed for that purpose level with the road or ground. The charcoal is protected from dirt and wet passing through the openings in the grate by a cover resting on the top of the socket or shoulder.

2453.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, London, C.E., for "*An improved construction of engine, which can be used either as a motor or for pumping.*" A communication. Patent dated Sept. 25, 1865.

The engine which forms the subject of the present invention has a cylinder, the sectional form of which taken in a plane parallel with the plane of motion of the pistons, resembles two united quadrants or sectors arranged in reverse positions within the cylinder, and both connected with the same crank-shaft. The connexions between the vibrating pistons and the crank are so arranged that each piston, though being only single acting, acts upon the crank during more than half of each of the revolutions of the latter. The crank is arranged directly between the vibrating pistons and within the cylinder, with a separate and independent connexion with each piston.

2465.—ALFRED VINCENT NEWTON, of 66, Chancery Lane, London, mechanical draughtsman, for "*An improved mode of decarbonizing retorts.*" A communication. Patent dated Sept. 26, 1865.

This invention relates to the employment of a current of air mixed with steam for the purpose of decarbonizing retorts, particularly clay retorts such as are usually used for manufacturing illuminating gas and for other purposes. These retorts are liable to absorb a quantity of carbon, and a large quantity of carbon or soot adheres to their inner surfaces, particularly towards the back. If this soot or carbon is not removed the retort becomes useless after a short time.

The mode of effecting the object of the invention is by the use of a small steam-blower. It consists of an air-pipe with a funnel-shaped mouthpiece and a steam-pipe, which extends transversely through the funnel-shaped mouthpiece, and from which the nozzle extends in the direction of the air-pipe. The air-pipe passes through a suitable hole in the head of the retort, or a supplementary head may be provided which can be attached to the mouth of the retort in place of the regular head. When steam is injected through the steam-pipe the current issuing from the nozzle causes a draught in the air-pipe, and a mixture of steam and air rushes into the retort. In its passage through the air-pipe this mixture is highly heated, and when it comes in contact with the carbon or soot adhering to the inner surface of the retort, it decomposes the same, so that it passes off in the form of gas, and the retort is thereby cleaned and rendered as good as new.

The air-pipe in its course through the retort can be supported simply by placing bricks under the same at suitable intervals, and it is intended to be made in sections so that it can be lengthened or shortened according to the spot where the mixture of steam and air is to take action. Other apparatus may be employed for the purpose of mixing air and steam.

2467.—JOHN HILLIAR, of Great Cambridge Street, London, manufacturer, for "*Improvements in apparatus for ventilating and for preventing down draught in flues.*" Provisional protection only obtained. Dated Sept. 26, 1865.

This invention consists of a funnel or shaft of any suitable horizontal section, but tapering upwards into an opening at top of at least one-third less area than the opening at the base, and surrounded by a casing or jacket to protect it from cold, and thus prevent the sudden cooling or condensation of the smoke, vapour, or hot air. In the centre are two plates of metal hinged and forming a valve, balanced by weights which are attached to them by strong wires or rods, so placed that the pulleys can pass each other. The position of the valve when at rest is partly open so as to freely admit an upward current, which would tend to increase the opening, while down draught would instantly close it. An arrangement of pipes may be employed for gas-burners as occasion may demand, their tendency being to rarefy the air in the shaft and promote an upward current.

2489.—ARTHUR RIGG, jun., of Chester, for "*Improvements in centrifugal pumps and fans.*" Provisional protection only obtained. Dated Sept. 28, 1865.

When water, air, or other fluid leaves the blades of centrifugal pumps or fans, it assumes a rotation with its forward motion. This invention consists in fixing vanes in such a manner as to lead the water or air striking against them into its ultimate required direction. By this means the force of rotation is converted into additional forward motion, and is not destroyed or lost as in ordinary pumps or fans. This addition will, in the case of screw fans or pumps, resemble another screw fixed behind the rotating blades, and with reversed blades, and in the common fan or pump, the guides will be fixed around the disc, and most conveniently attached to the casing.

2503.—CHARLES FORSTER COTTERILL, of Cannock, Stafford, for "*Improvements in connexions for and in stopping pipes used for conveying water and gas, and for other like purposes, and in preventing leakages in the said pipes, and in apparatus employed therein.*" Patent dated Sept. 29, 1865.

This invention consists, firstly, of the improvements hereinafter described in making connexions to main pipes used for conveying water and gas, and in apparatus employed in drilling the said main pipes for the said and other connexions.

In making a connexion to a main water-pipe according to this invention, there is fixed on that part of the pipe at which the connexion is to be made a circular strap or collar, which strap or collar being made in halves clips the pipes firmly and forms a permanent part thereof. The said halves of the collar are fixed together and to the pipe by flanges, through which screws are passed. A washer or ring of india-rubber or

* I take this opportunity of saying that a reprint of that work is now being published in my name and without my authority, and even against my wishes. I mention this for fear it may be thought that this work is a new edition by me, and is my account of the present state of knowledge. As far as I am concerned, it only represents the state of knowledge in 1856.

leather is interposed between the strap or collar and the pipe at the top thereof. A screwed hole is made in the strap or collar, and a hole is also made in the india-rubber or leather washer opposite the screwed hole. Through the said holes the drill is passed in order to drill the hole in the main pipe. The drill used for drilling the hole is carried by a frame or clamp of the ordinary kind, or any other kind adapted to the purpose. Above the screwed hole in the strap or collar is placed an inverted tundish or conical vessel, through a hole in the summit of which the drill passes. By means of the said tundish or vessel the water, when the drill has penetrated through the pipe, is prevented from striking and wetting the workmen using the drill. The said tundish is particularly useful when the water in the main is under pressure. After the hole has been made in the main pipe coincident with that in the clip or collar, a pipe for the private supply is screwed into the screwed hole in the said clip or collar and the connexion is complete. By making connexions in the manner described, the loss of water is very small, and the main pipe is strengthened. This part of the invention is applicable to earthenware pipes as well as to iron water-pipes, and may be applied to gas-pipes where a strong connexion is required.

The invention consists, secondly, of the following arrangement of parts for temporarily stopping the open ends of earthenware pipes used for conveying gas and water, and for other like purposes, during the laying of the said pipes or otherwise. Near the end of the pipe to be closed is fixed two semi-circular clips, to which clips a rectangular frame is connected, the said frame carrying a strong screw. Upon the open end of the pipe a disc or valve of iron is placed, the said valve having on its inner face an india-rubber or leather disc or washer. By placing this disc or valve against the open end of the pipe, and driving home the end of the screw so as to make it bear against the said valve, the valve is held very securely against and in close contact with the pipe, and the said pipe is effectually stopped.

The invention consists, thirdly, in stopping fractures or leaks in earthenware pipes used for conveying water and gas and for other purposes, by means of circular clips or collars of earthenware or sheet iron, the said clips or collars being made in halves. Into the space between the said clips or collars and the exterior of the pipe is poured, in a liquid state, through a hole in the said clips or collars, the filling composition described in the specification of letters patent granted to the present inventor on the 13th of April, 1865, No. 1058, or other composition may be employed. When the fracture is small it is covered with a band of india-rubber, gutta-percha, or leather, which is fixed thereon by the semi-circular clips described, the filling composition between the clips or collars and the pipe being in this case dispensed with.

2507.—JOHN ADDENBROOKE and GEORGE ADDENBROOKE, both of Darlaston, Staffordshire, ironmasters, and PHILIP ANTHONY MILLWARD, of the same place, engineer, for "*Improvements in collecting or drawing off the gases from blast-furnaces.*" Patent dated Sept. 29, 1865.

In order to more thoroughly disseminate the gases at the top of the furnace than by other modes in which they are generally concentrated, a number of openings are formed around the throat on the outside, by preference at about 4 or 5 feet from the top. An enclosed channel or gas-flue is also formed, between which channel or flue and the interior of the furnace itself these openings form separate and collective communications at any convenient point. At the side of the aperture or circular confluence-chamber last mentioned a main opening is made. Through this main opening the collected gases are conducted first into a receiver and thence through suitable pipes or tubes to any places at which they are intended to be utilized. The apertures above mentioned through the neck of the furnace are made to incline downwards from the exterior to the interior surface at a considerable angle, in order to prevent any of the materials when charged falling or escaping from the interior of the furnace through the apertures into the confluence-chamber or flue surrounding the same.

2527.—SILAS COVELL SALISBURY, civil engineer, of New York, U.S.A., for "*Improvements in producing and combining gases to be used for heating purposes, and in the construction of retorts for producing and combining such gases.*" Patent dated Oct. 2, 1865.

This invention or discovery has relation, firstly, to the production of gases from petroleum or other hydrocarbon, water, and air, and their combination in such proportions of carbon, hydrogen, and oxygen, that such combined gases when brought into contact with the gases produced from the fuel and heated air of or generated in any ordinary furnace will unite therewith, producing a new combination which will give when burned a much more intense heat than can be obtained from any ordinary combustion of coal or fuel, and which can be used with great economy and effect in generating steam for engines, heaters, &c., also for heating purposes.

Secondly, the invention relates to the arrangement of retorts for producing and combining such gases of oil, water, and air, and applying them to use.

The relative or proportionate quantities of oil, water, and air, used for the production of gases therefrom should be such that the gas combined or made up of the several gases derived from these substances will have such proportions of carbon, hydrogen, and oxygen, that it will not be explosive as it comes in contact with the gases produced or derived from the fuel or heated air of the furnace. Experiment has proved that the proportion of 1 cubic inch of petroleum to 2½ cubic feet of water and 5 cubic feet of air is suitable for the purposes desired, but such proportion may be considerably varied with safety, and satisfactory results still obtained. Such gases of the oil, water, and air, so combined in proper proportions, unite or mix with the ordinary gases produced from the coal, and heated air of or generated in furnaces, when brought in contact therewith in a greatly increased volume, and burned in combination therewith, they produce a heat or flame much more intense than can be produced or obtained from any ordinary combustion of fuel. Such mixture or combination is also so light that it passes up around, and shoots through the tubes or flues of the boiler in the form of a delicate flame, but of great intensity, and thus it is effectual over every part of the boiler.

2544.—ALLAN CRAIG, of Leeswoodhill Colliery, Mold, Flintshire, for "*Improvements in apparatus for extracting oil from coal, shale, and other minerals.*" Provisional protection only obtained. Dated Oct. 4, 1865.

These improvements apply to the retorts used for extracting oil from coal, shale, and other minerals containing oil. It is proposed to draw off the oil from the retort at the bottom, which, although attempted, has been hitherto found impracticable, owing to the difficulty of keeping the dust and dirt out of the oil, and also the difficulty of discharging the coke from the retort. To obviate these difficulties it is proposed to construct a retort with a hopper at the top for supplying the coal or mineral, and a vessel containing water at the bottom, and with the usual fireplace and flues for heating the same, the diameter of the retort at the bottom being larger than at the top. In the interior of this is placed a casing constructed (by preference) in a cylindrical form, and consisting of a series of pieces or rings placed one above the other, so as to present a perfectly smooth and cylindrical surface on the exterior. Those pieces or rings are so constructed as to leave interstices or spaces between each, and so that the lower edge of each ring shall overlap the upper edge of the one below it. The oil from the coal or other mineral passes through these interstices or spaces into the interior of the casing, and passes out through a horizontal or other pipe connected to the latter at or near its lower end.

2549.—JAMES WEBSTER, of Birmingham, Warwickshire, engineer, for "*Improvements in gas-meters.*" Patent dated Oct. 4, 1865.

This invention consists of improvements in meters for regulating the flow of gas, by constructing the drums of such meters with fans, the blades of which are fixed helically or in screw form around the centre drum or spindle. The chamber for the induction-pipe is formed at the end of the drum, instead of centrally, the eduction-pipe being placed as usual.

2567.—RICHARD ARCHIBALD BROOMAN, of 166, Fleet Street, London, for "*Improvements in rotary engines and pumps.*" A communication. Provisional protection only obtained. Dated Oct. 6, 1865.

This invention consists in constructing rotary engines as hereafter explained. A cam-shaped block is fixed in the centre of a circular case; an aperture in the centre of the block gives passage to a shaft fixed in a disc piston carrying in slots sliding vanes; there is an inlet and outlet passage, and between them a curved guide is fixed on the inside of the edge of the case. There is a cover fitting tight to the case, and stuffing-boxes surround the shaft, both in the case and cover. Upon steam being admitted through the inlet-passage its course is stopped in one direction by the end of the curved guide, and it acts upon such of the vanes as are protruded from the piston by the inner fixed cam-shaped block, and drives them, as well as the piston, round. As soon as each vane passes the outlet-passage the steam behind it escapes, and the outer end of the vane, coming in contact with the curved guide at its rise, is gradually driven in until the guide fills the space between the piston and the edge of the case. After passing the guide, the inner cam-shaped block drives out the vane to be acted on as before described, and so on with all the sliding vanes. When used as a pump, liquid, instead of steam, is received at the inlet-passage.

2580.—THOMAS VINCENT LEE, of Macclesfield, Chester, for "*Improved methods in the manufacture of candles from peat and petroleum, and also for the adaption of the same materials in combination with other chemical affinities for illuminating purposes.*" Provisional protection only obtained. Dated Oct. 7, 1865.

This invention consists in the employment of peat or turf properly dried by the application of hydro-calorie or superheated steam, produced by a process similar to that described in the specification of a patent granted to the present inventor, dated the 21st of December, 1853, No. 2969, for improvements in the manufacture and drying of bricks, tiles, drain-pipes, porcelain, and all other articles produced from plastic substances; and also in the specification of another patent granted to him, dated the 29th of May, 1855, No. 1229, for generating steam in marine and other boilers. After drying the peat or turf it is ground into a fine powder, as nearly impalpable as possible, and then mixed with petroleum, in proportions—say 1 oz. of petroleum to 1 lb. of ground peat or turf (but the patentee does not confine himself to any such proportions), adding such scent or perfume (say gum benzoin and camphor, or any other aromatic material, alone or combined) as it is desired the candle or illuminating body should diffuse in the chamber, room, or place where it is burnt. The material or substance is then subjected to pressure in a mould of the size and form it is intended the illuminating body should assume, and, in case of a candle, instead of having a wick, the centre is left hollow for the purpose of supplying the material with sufficient air for perfect combustion. This hollow can be made in any form, plain, spiral, or otherwise, but when it is intended the illuminating body should have a slow rotary motion, the spiral form is used, and in such case the candlestick or socket for burning the same should be provided with a spur wheel and pinion, or their equivalents.

2603.—WILLIAM COOKE, of Park House, St. James's, Middlesex, for "*Improvements in sanitary window fittings.*" Provisional protection only obtained. Dated Oct. 10, 1865.

These fittings consist of laminæ or pieces of wire gauze or other perforated material so constructed as to represent blinds, cornices, or ventilators, and are formed as follows:—The wire gauze or other material used is stretched upon frames of metal, wood, or any suitable substance, in pieces, strips, or folds. Each blind, cornice, or ventilator consists of two pieces, or more, so formed as to expand or contract at pleasure, and thus fit various sized windows or openings. By hinging together any number of these laminæ, slabs, or ventilating blinds, they can be made to fill up any space left open by a window partially or entirely open, and they can be also made to open and shut at pleasure.

2609.—JOHN GARRISON WOODWARD, of St. John, New Brunswick, merchant, for "*An improved ventilating apparatus for use in steamboats, vessels, and other places requiring to be ventilated.*" Patent dated Oct. 10, 1865.

This invention consists in a ventilating casing surrounding or contiguous to the smoke-pipe or funnel, through which air is drawn from the engine and fire-room by the column of air ascending by being warmed by the smoke-pipe. This current of air taken from the engine-room conveys

away any noxious gases, dust, vapours, and also the heated air, and in place thereof the cool air will descend by a natural action through the hatchways, thus rendering the engine-room of an agreeable temperature; and this system of ventilation may be extended by pipes to the other portions of the vessel. The said ventilating case is also conveyed up above the top end of the smoke-stack or funnel of the boilers, in order that the ascending ventilating current of air may increase the draught of air passing through the furnace.

2614.—RICHARD ABELL, of Cambridge Terrace, Pimlico, London, carpenter, for "*Improvements in trapping and ventilating sewers.*" Provisional protection only obtained. Dated Oct. 10, 1865.

In carrying out this invention the gully opening is adopted as the ventilator escape, which is trapped in such a way that while there is free downward passage for the water, there is also an upward escape for the gases; but which gases at the same time are so trapped as to be constrained to pass through a body of charcoal in order to their disinfection.

2615.—JOHN JOSEPH PARKES, of London Street, Paddington, gas engineer, for "*Improvements in the manufacture of railway-station and other gas-lamps.*" Patent dated Oct. 10, 1865.

This invention relates to the construction of lamps of a class forming the subject of a patent granted to the present patentee, dated June 26, 1862, No. 1876, which lamps are particularly applicable for railway-stations, or in large exposed areas, either enclosed or open, the great object of the improvements being to produce a glazed lamp, the frame of which shall throw little or no shadow, and yet at the same time possess the requisite strength, and also facilities for lighting and cleaning the lamp.

According to these improvements the ribs, which stand in a vertical plane, are made of a strip of copper or other suitable metal, drawn into the form of a round bead in cross section, with narrow flanges, one on either side, throughout the length. The parts of the metal where curled to form the bead do not touch, a narrow space being left between for the reception of a rib or feather piece or edge, which projects from the flat or flange side of the bead and inside lamp. These ribs are united in a circular band above and below, pins entering the ends of the beads through the bands, and the whole being riveted and soldered together. A metal band is carried round at the largest diameter of the lamp, united to the whole of the upright ribs. This mid-band is of a half-round bead-like form, with flanges of larger size than the upright ribs, which are dovetailed across and into it, flush on the inside. This band is also strengthened by a rib or edge in the interior of the bead, which is introduced in sections between the feathers of the upright ribs and flush therewith. These projecting ribs or feathers inside the lamp serve to receive the glass which is puttied therein and introduced from the inside. There are six (more or less) pieces of glass in the upper half and six in the lower, each piece being in the form of the section of a sphere. The top ring is double, one part being fixed to the upright ribs, the other part fitting within the fixed one and rotating therein freely, but held by pins working in slots. This moveable ring supports the door of the lamp at the top, which door consists of one of the panes of glass fixed in a separate frame. The door is further supported at bottom by a part or parts fitted in a slot or slots in the large mid-bead, in the direction of which it is traversed round in opening or closing the said door. This door is formed of a light frame of V-shaped metal to receive the glass and lie close on the upper surface of the lamp. The glass of the upper half of the lamp, in addition to the holding of the putty to keep it in place, is received at its upper edge between two flanged-like parts of the upper fixed ring.

These lamps are suspended by three rods or tubes, one forming the gas duct, which unite with the lamp at equidistant points around the mid-bead, and at points where the upright rods intersect. To make the junction of the suspending parts a ball or enlarged like piece is applied, having at one part a four-branched like projection, which fits on and embraces the intersecting parts of the ribs and mid-band, the whole being fixed through with a pin and soldered in that pendant conducting the gas. The four-branched like piece is made separate from the ball or enlargement, which in this case embraces also the stop-tap, the parts being fixed together by a hollow nipple. The gas passes from this point to the burner through one of the upright ribs, instead of by a tube within the lamp as formerly. An upright stand-pipe from the bottom ring and gas rib carries the burner. The feather in the gas rib is omitted in the interior of the bead to leave the channel free. The top piece or canopy in which the three rods unite is cast hollow in one piece, instead of forming it in pieces as formerly. The whole of the metal of the lamp is tinned to protect it from the action of the gas.

APPLICATIONS FOR LETTERS PATENT.

1666.—JAMES PARKER, of 6, Lilford Road, Camberwell, in the co. of Surrey, gentleman, for "*Improvements in motive-power apparatus, applicable for propelling vessels, for raising water, and for other purposes.*" June 22, 1866.

1696.—ALFRED CLAYTON, of Kingston, in the co. of Surrey, for "*An improved apparatus for registering the flow of water or other liquids or fluids through pipes or orifices.*" June 26, 1866.

1698.—CHARLES FORSTER COTTERILL, of Cannock, in the co. of Stafford, gentleman, for "*Improvements in the manufacture of earthenware and other pipes, and in machinery or apparatus to be employed in the said manufacture.*" June 26, 1866.

1710.—WILLIAM ROBERT LAKE, of 8, Southampton Buildings, Chancery Lane, in the co. of Middlesex, consulting engineer, for "*Improvements in the mode of distilling or separating volatile products from oils and other fluids.*" A communication. June 27, 1866.

GRANTS OF PROVISIONAL PROTECTION.

814.—ALEXANDER ANGUS CROLL, of Coleman Street, in the City of London, civil engineer, for "*Improvements in arranging conduits or channels for the reception of gas, water, and other mains, tubes, or pipes, and telegraphic wires, also for the conveying away of smoke or noxious vapours from buildings, and for the ventilation of buildings and other places.*" March 19, 1866.

1600.—JAMES NICHOLAS, of Aspull, near Wigan, in the co. of Lancaster, oil refiner, for "*Improvements in retorts, and in the mode of working the same to obtain crude paraffin and other oils from cannel coal, bituminous matter, wood, peat, bones, or other material.*" June 12, 1866.

1615.—GEORGE DUNBAR MALAM, of Halifax, in the co. of York, gas engineer to the Halifax Corporation, for "*The purifying of ammoniacal liquor by an improved process, and the application of such purified ammoniacal liquor to the purifying of coal gas.*" June 14, 1866.

1628.—BENJAMIN FRANKLIN STEVENS, of 17, Henrietta Street, Covent Garden, in the co. of Middlesex, gentleman, for "*A new or improved method of treating permanent inflammable gases, whereby greater heat is obtained therefrom.*" A communication. June 15, 1866.

1636.—GEORGE HENRI MARC MUNTZ, of Birmingham, in the co. of Warwick, manufacturer, for "*Improvements in the manufacture of certain fittings for gas, steam, and water tubes.*" June 16, 1866.

1696.—ALFRED CLAYTON, of Kingston, in the co. of Surrey, for "*An improved apparatus for registering the flow of water or other liquids or fluids through pipes or orifices.*" June 26, 1866.

1698.—CHARLES FORSTER COTTERILL, of Cannock, in the co. of Stafford, gentleman, for "*Improvements in the manufacture of earthenware and other pipes, and in machinery or apparatus to be employed in the said manufacture.*" June 26, 1866.

1710.—WILLIAM ROBERT LAKE, of 8, Southampton Buildings, Chancery Lane, in the co. of Middlesex, consulting engineer, for "*Improvements in the mode of distilling or separating volatile products from oils and other fluids.*" A communication. June 27, 1866.

NOTICES TO PROCEED.

416.—JAMES JOHN SHEDLOCK, of 6, Shaftesbury Villas, Kensington, in the co. of Middlesex, gas engineer, for "*Improvements in gas-burners.*" Feb. 10, 1866.

434.—CHARLES DENTON ABEL, of 20, Southampton Buildings, Chancery Lane, in the co. of Middlesex, patent agent, for "*Improvements in gas and air engines.*" A communication. Feb. 12, 1866.

504.—JOHN FLETCHER, of Ashton-under-Lyne, in the co. of Lancaster, brass-founder, for "*Improvements in valves for regulating the pressure of steam and other fluids.*" Feb. 17, 1866.

513.—JOSHUA KIDD, of Battersea Rise, in the co. of Surrey, gas engineer, for "*Improvements in carburetting low-pressure superheated steam, air, or coal gas for lighting and heating purposes, for generating steam or hydrocarbon vapour, and in apparatus employed therein.*" Feb. 17, 1866.

518.—ERNEST MARIÉ DU BOYS, Government engineer, of Boulevard de Strasbourg, Paris, France, for "*Improvements in apparatus for measuring and registering the flow of water or other liquids.*" Feb. 20, 1866.

538.—WILLIAM WEBB, of Smethwick, in the co. of Stafford, manufacturer, for "*Improvements in the manufacture of tubes and hollow cylinders, and in the machinery to be employed in the said manufacture.*" Feb. 21, 1866.

603.—HUGH ROBERTSON, of Motherwell, in the co. of Lanark, N.B., for "*Improvements in the manufacture of oil and other products from bituminous substances, and in the machinery or apparatus employed therein, which improvements or parts thereof are also applicable to the manufacture of white lead or other pigments.*" Feb. 27, 1866.

606.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*An improved process of and apparatus for distilling petroleum and other liquid substances.*" A communication. Feb. 27, 1866.

616.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*Improvements in the process of and apparatus for the distillation of tar and other substances.*" A communication. Feb. 28, 1866.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

1523.—WILLIAM NAYLOR, "*Improvements in apparatus for compressing, holding, and regulating the pressure of gas.*" June 17, 1863.

1550.—CHARLES PETERSON, "*A new material or compound applicable to the manufacture of pipes or tubes, to caulking or covering ships bottoms, and to other useful purposes.*" June 20, 1863.

1567.—LOUIS ANTOINE MAJOLIER, "*Improvements in apparatus for carburetting gases.*" June 22, 1863.

1569.—WILLIAM CLARK, "*Improvements in apparatus for charging air or gases with combustible vapours.*" June 22, 1863.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, JUNE 25, 1866.

The NEATH NEW GAS Bill was reported, with amendments.

The CEFN ACREFAIR AND RHOSYMEDRE WATER, and the ROCHDALE WATER Bills, were returned from the Commons, with the amendments agreed to.

The SHEFFIELD UNITED GAS; KILMARNOCK WATER; and the BRIGHTON AND HOVE GENERAL GAS Bills, were read the third time, with the amendments, and passed, and sent to the Commons.

Petitions were deposited against the GASLIGHT AND COKE COMPANY Bill, from the Metropolitan Board of Works, and from the Corporation of London;—and against the GASLIGHT AND COKE AND CITY OF LONDON GASLIGHT AND COKE COMPANIES Bill, from the Corporation of London.

TUESDAY, JUNE 26.

The BRIDGE OF ALLAN WATER Bill was reported, with amendments.

The WEARDALE AND SHILDON DISTRICT WATER; the GREENOCK AND SHAWS WATER; the GREENOCK WATER; and the GLASGOW CORPORATION WATER Bills, were referred to a Select Committee, consisting of Lord Wrottesley (chairman), Earl Rosse, Lord Suffield, Lord Sheffield, and Lord Tredegar, who will meet on June 29, at eleven o'clock.

WEDNESDAY, JUNE 27.

The BRYNMAWR GAS Bill was returned from the Commons, with the amendments agreed to.

THURSDAY, JUNE 28.

The NEATH NEW GAS Bill was read the third time, with the amendments, and passed, and sent to the Commons.

The following Bills received the Royal Assent:—The CLEETHORPES GAS; BARNSLEY LOCAL BOARD OF HEALTH; CANTERBURY GAS AND WATER; STOCKTON GAS; BRITISH GAS COMPANY (STAFFORDSHIRE POTTERIES); LIVERPOOL CORPORATION WATER; LONGTON GAS; ALDRINGTON, HOVE, AND BRIGHTON GAS; DUNDEE WATER; WIGTON WATER; ROCHDALE WATER; CEFN AREFAIR AND RHOSYMEDRE WATER; and the BRYNMAWR GAS.

Petitions were deposited against the GASLIGHT AND COKE COMPANY Bill, from frequenters of Victoria Park, and from the Board of Managers of the London Orphan Asylum, at Clapton.

FRIDAY, JUNE 29.

GASLIGHT AND COKE COMPANY'S BILL.

On the order of the day for the second reading of this bill,

Earl NELSON moved that the bill be read a second time that day three months. He said a great number of petitions had been presented against the bill from persons resident in the neighbourhood of Victoria Park, who feared that if the gas-works authorized by this bill, and which it was stated would cover an area of more than 100 acres, were erected, that park would be spoiled as a place of recreation for the people. Previous legislation in regard to railways had forced large numbers of the working classes to seek abodes in the outskirts of London, and in the neighbourhood of Victoria Park were many lodging-houses occupied by the poorer portion of them. The committee of the House of Commons to which this and other gas bills were referred, had presented a very able report upon the whole question of the supply of gas to the metropolis; and he understood that the Government had undertaken to bring in, next session, a bill founded on many of the recommendations of that report. Well, with this report before it, he was at a loss to conceive how the House of Commons had been induced to pass this and other gas bills. The whole question of gas supply was one between small companies and aggregated companies, or the grouping of companies. To allow a number of companies to be grouped together, and thus sanction the system, was to prejudge the question which would otherwise be left open. He had no doubt that the aggregation of companies, if two things could be secured, would be advisable; and those two things were, the prevention of monopoly and the selection of a site for the works which would do as little injury as possible. He had thought it his duty to go to Victoria Park and inspect the locality for himself, and he did so unaccompanied by any gentlemen either favourable or opposed to the bill, and he would now briefly describe what met his view. He entered the park at the south-eastern entrance, where he saw the trees and flowers in a flourishing condition, and in the centre of the park a piece of water, with boats upon it, and ornamented with islands. Further on he came to gymnasiums, and other means of amusement for the people of the neighbourhood. On getting to the north side of the park, however, a change came over their admiration. The trees in that part of the park were beginning to wither, the cause being found in the smoke which came from some large chimneys a mile away. It was, therefore, not an idle dream that the people in the east end of London entertained in regard to the injury they anticipated to the park if the proposed gas-works were erected within 500 yards of it. He would now refer to a letter he had received from the Rev. Septimus Hansard, a clergyman who had resided in the neighbourhood since the time of the great Chartist riot. That gentleman bore witness to the fact that the health and moral character of the people had greatly improved, and a great deal of this he attributed to the opening of Victoria Park, for now at their holidays they assembled to the number of 160,000 or 180,000 in that park, instead of having recourse, as in former days, to cock and dog fighting, and spending their time in public-houses and other places of low resort. Now, when he remembered that their lordships were induced to throw out a bill for the erection of extensive gas-works at Chelsea, because it was an endeavour to try an experiment for the first time of establishing a large gas company instead of a small one, he felt that he would not be appealing in vain when he asked their lordships not to allow a similar experiment to be tried in the neighbourhood of this valuable park, which tended so much to improve the health and strength and the moral character of the people of the locality. He begged to move that the bill be read a second time that day three months.

The Lord CHANCELLOR said he was unwilling to take part in the discussion, as all he knew of the subject was gathered from papers in the hands of all their lordships. At first his feelings were in harmony with those of the noble earl, believing that the proposed works would materially injure the park. At the same time it appeared that the matter had been investigated by a committee of the House of Commons, which had come to the conclusion that the works would not injure the park in question, whilst the object was to remove works from crowded parts of the metropolis to what was practically half a mile from Victoria Park. It appeared to him that the most reasonable course would be to refer the bill to a committee of that House. Were the House to act simply upon the petitions that had been presented—and nobody knew how the signatures had been obtained—incalculable injury might be done, and he trusted their lordships would not agree to the motion of the noble earl.

Lord BROUGHAM thought the petitions from the working men in the east of London should have their due weight, and he trusted that nothing would be done that would be detrimental to a place of so much importance to the health and moral character of the people.

Lord RAVENSWORTH observed that if it was proposed, as the noble earl stated, to bring in a general bill to regulate the establishment of gas manufactories, it would be very undesirable to give augmented powers to particular companies with a view to enable them to increase the manufacture of an article, the effects of which were described as so injurious to the neighbourhood, until such a general bill should be brought forward. Taking the whole of the circumstances into consideration, if the noble earl should persevere in his motion, he felt very much disposed to give it his support with a view to future legislation.

Lord CHELMSFORD: Considering the bill has been passed by the House of Commons, I do not think it would be right to reject it so summarily as the noble earl proposes. The simple question is as to whether the gas-works would be injurious to the vegetation of Victoria Park. The committee of the House of Commons have fully considered that question, and have come to the conclusion that the works would not injure the trees and shrubs supposed to be in danger. And, my lords, when I consider that no part of the park is nearer to the proposed site for the works than 633 yards, I cannot understand how it is at all likely the works would injure the trees. Under any circumstances, as the question at issue is so much a matter of fact and evidence, I certainly think it should be referred to a select committee of your lordship's House, and if the members of that committee should come to a decision different from that arrived at by the committee of the other House the bill would be very properly rejected. To dismiss it now would, in my opinion, be most improper, and I shall therefore vote against the amendment proposed by the noble earl.

Lord TEYNHAM: There is no doubt that the inhabitants of the district where it is proposed to place the works have many fears respecting the effects of erecting gas-works on the site proposed; and although the House of Commons may have decided that those fears have no foundation, and although a committee of your lordships House may come to a similar decision, the fears of the inhabitants and their dissatisfaction at the result will still remain. I therefore trust that your lordships will not permit the bill to pass, seeing how seriously it will interfere, if carried, with a large district thickly populated with industrious though poor people.

The EARL OF CAITHNESS: I had not the slightest intention on coming down to your lordships' House of saying anything—no, I do not mean that; because I had an intention of saying something, though very little. I find that if the object of the promoters of this bill were carried out, three large gas-works would be removed from a densely populated district in the centre of London to a suburb respecting which as a site far less objection can be raised than can be offered to the place at present occupied. With this fact before me I must say that the bill is worthy of consideration, and I trust your lordships will send it to a select committee and not dispose of it without inquiry.

Earl BEAUCHAMP: I do not think we can attach much importance to the decision of the select committee of the House of Commons, for this reason—the inhabitants of the neighbourhood of Victoria Park desired to be heard by counsel before the committee, but it was decided that they had no *locus standi*, and accordingly they had no opportunity of stating their case. The investigation made by a committee under these circumstances must have been necessarily incomplete; and as no more satisfactory course can be adopted before a committee of your lordships House, I trust the inhabitants of the district will be saved the expense of a preliminary fight with the endeavour to secure a hearing. If the inhabitants could be heard by counsel before the committee the case would be different, but as the fact is otherwise I shall support the amendment proposed by the noble earl.

The BISHOP OF LONDON was understood in the first part of his observations to allude to some remark made by a noble lord last year with respect to the persons who should bear the expense of promoting or opposing gas bills, and said that if the remark applied to the case of last year, it applied with still more force now. He proceeded: Those who object to the passing of the present bill are of the poorest class, utterly incapable of raising £1000 or £1500, the sum which I understand is required as fees for counsel and other expenses incurred by opposing a measure before Parliament in a proper manner. Yet if opposition is to be carried on, it is the poor Bethnal Green weavers who must pay for it. It is they who must see that no other district of London is relieved at their expense. But there is another reason which induces me to support the amendment proposed by the noble earl. I understand that another site is obtainable, the neighbourhood of which is thinly populated, and to which very little objection indeed can be raised. The assertion that trees at a distance of 600 yards from a gas-work are out of harm's way is not at all supported by my experience. I think it a very short distance. Either the noble lord who made the statement must have been misinformed or my experience must be singularly at fault. I have had the misfortune to live about that distance from gas-works, and I have found that vegetation is materially affected by the vapours emitted. And when the wind sets from the direction of the works, the health of the inhabitants is affected as well as the vegetation.

Lord OVERSTONE said the real question was whether at 600 yards distance the gas-works would be injurious as alleged. If they would be, he apprehended that that House would be unanimous in throwing out the bill; but at the same time he thought their lordships would not be inclined to be so unreasonable and unjust as to arrive at a conclusion that they should throw the bill out without inquiry. He thought it was their duty to give the bill a second reading.

The MARQUIS TOWNSHEND said he did not see any reason why they should refer the bill to a select committee. It appeared to him that there was sufficient evidence to enable them to arrive at a conclusion at once. He thought they ought not to allow these companies to overthrow and trample down the rights of the working classes.

Lord REDESDALE said there was no doubt gas-works were an absolute necessity and must be placed somewhere in the metropolis, and if the objections of those who opposed this bill were to prevail, he did not know how they were to put them anywhere. The real matter to be determined was whether there was any particular objection to a particular site. It had been objected that these parties had been refused a hearing in the other House of Parliament because they had no *locus standi;* but it was always within the power of a committee, at least in this House, to allow a *locus standi*. But there need be no fear of this question not being fully discussed before the committee, because among the petitioners against the bill were the corporation of London, the Metropolitan Board of Works, and the Hackney District Board of Works. These various corporations could bring the whole case before the committee by bringing up a sufficient number of these poor people to have their evidence taken before the committee. By that means they might obtain a full discussion before the committee on the merits of the bill. Under these circumstances he should certainly advise their lordships not to reject the bill on the second reading. There were very few cases in which they did reject a private bill on the second reading; they never did it unless there were very strong grounds for so doing, and in this instance he did not think those grounds sufficient.

The EARL OF CARNARVON said he should like to ask his noble friend,

the chairman of committees, whether the petitions he had mentioned were against the bill as a whole, or against particular clauses. It was necessary to know this in order that the House might be sure that the whole subject would receive full consideration in committee. If the whole case would be thoroughly investigated, then he agreed with his honourable friend that the bill ought to go to a select committee. But on the other hand, if there was a question on that point, then he thought the arguments told rather against the bill than in its favour, because his noble friend on the bench below him (Earl Nelson) had stated that the gas-works would be within 500 or 600 yards of Victoria Park, and would cover 100 acres of land; and when they considered that that distance was only about a third of a mile, he thought it must be evident that the gas-works would be very injurious to the park.

Lord REDESDALE said he could not inform the noble lord what was the precise character of the petitions against the bill; he only knew that there were petitions. At the same time it was not likely that either the Metropolitan Board of Works or the corporation of London would petition on any other ground than that of the public interest. He might observe, too, that after this discussion the committee would be very cautious, and take care that all these matters were fully inquired into.

Earl NELSON, in reply, said the vegetation in the park had already deteriorated by reason of the present works in the neighbourhood, and it stood to reason that if works of this magnitude were constructed within 600 yards the atmosphere in the park must be vitiated. He should like to know if their lordships would permit immense gas-works like these to be erected within 600 yards of Hyde Park.

The House then divided, when there appeared—

Contents	26
Non-contents	27
Majority	1

The bill was consequently lost.

THE DIVISION.

CONTENTS, 26.

Cranworth, L. (*L. Chancellor.*)	Aveland, L.
York, Archp.	Belper, L.
Westmeath, M.	Camoys, L.
Brooke and Warwick, E.	Chelmsford, L.
Caithness, E. [*Teller.*]	Churchill, L.
Ducie, E.	Congleton, L.
Harrowby, E. [*Teller.*]	Crofton, L.
Malmesbury, E.	Ebury, L.
Minto, E.	Kilmaine, L.
Somers, E.	Overstone, L.
Bolingbroke and St. John, V.	Ponsonby, L. (*E. Bessborough.*)
Peterborough, Bp.	Redesdale, L.
St. David's, Bp.	Wensleydale, L.

NOT-CONTENTS, 27.

Townshend, M.	Brougham and Vaux, L.
Beauchamp, E.	Granard, L. (*E. Granard.*)
Belmore, E.	Grinstead, L. (*E. Enniskillen.*)
Carnarvon, E.	Heytesbury, L.
Dartmouth, E.	Lovel and Holland, L. (*E. Egmont.*)
Nelson, E. [*Teller.*]	Moore, L. (*M. Drogheda.*)
Powis, E.	Panmure, L. (*E. Dalhousie.*)
Hawarden, V.	Ravensworth, L. [*Teller.*]
Gloucester and Bristol, Bp.	Saltersford, L. (*E. Courtown.*)
Lichfield. Bp.	Silchester, L. (*E. Longford.*)
Lincoln, Bp.	Teynham, L.
London, Bp.	Wentworth, L.
Oxford, Bp.	Wharncliffe, L.
Salisbury, Bp.	

Petitions were deposited against the GASLIGHT AND COKE COMPANY Bill, from Vestry of St. Matthew, Bethnal Green; from medical profession of Hackney; from owners of property, &c., near Victoria Park; from visitors and frequenters of Victoria Park; and from inhabitants of Limehouse and persons signing.

MONDAY, JULY 2.

The WALKER AND WALLSEND UNION GAS Bill was reported (on recommitment) with amendments.

The BRIGHTON AND HOVE GENERAL GAS; the KILMARNOCK WATER; and the SHEFFIELD UNITED GAS Bills, were returned from the Commons, with the amendments agreed to.

The ALDERSHOT GAS AND WATER Bill, was returned from the Commons agreed to, with amendments.

The UNITED GENERAL GAS COMPANY (DUBLIN) Bill, was returned from the Commons agreed to.

TUESDAY, JULY 3.

The GASLIGHT AND COKE AND CITY OF LONDON GASLIGHT AND COKE COMPANIES Bill, was read a second time, and committed.

THURSDAY, JULY 5.

ALDERSHOT GAS AND WATER Bill.—Commons amendments considered, and agreed to.

The BRIDGE OF ALLAN WATER, and the WALKER AND WALLSEND UNION GAS Bills, were read the third time, with the amendments, and passed, and sent to the Commons.

The ALLIANCE AND DUBLIN CONSUMERS GAS COMAPNY Bill was returned from the Commons agreed to, with amendments; the said amendments were considered, and agreed to.

A petition was deposited against alterations in the GREENOCK AND SHAWS WATER Bill, from the Greenock Cotton Spinning Company.

HOUSE OF COMMONS.

MONDAY, JUNE 25, 1866.

The CEFN ACREFAIR AND RHOSYMEDRE WATER Bill was agreed to, as amended by the Lords, with amendments.

The ROCHDALE WATER Bill was agreed to, as amended by the Lords.

TUESDAY, JUNE 26.

The BRYNMAWR GAS Bill was agreed to, as amended by the Lords.

The ALLIANCE AND DUBLIN CONSUMERS GAS Bill, as amended, was considered; to be read the third time.

The IMPERIAL GAS COMPANY (No 3) Bill was referred to a Select Committee, consisting of Mr. Mainwaring (chairman), The O'Donoghue, Mr. A. H. Baring, and Mr. E. W. Lascelles, who will meet on July 5, at twelve o'clock.

THURSDAY, JUNE 28.

The ALDERSHOT GAS AND WATER Bill, as amended, was considered; to be read the third time.

MONDAY, JULY 2.

The BRIGHTON AND HOVE GENERAL GAS; the KILMARNOCK WATER; and the SHEFFIELD UNITED GAS BILLS, were agreed to, as amended by the Lords.

The ALDERSHOT GAS AND WATER Bill was read the third time, and passed, with amendments.

The UNITED GENERAL GAS Bill was read the third time, and passed.

The NEW RIVER COMPANY Bill, as amended, was considered; to be read the third time.

THURSDAY, JULY 5.

The IMPERIAL GAS COMPANY (No. 3) Bill was reported.

The ALLIANCE AND DUBLIN CONSUMERS GAS Bill was read the third time, and passed, with amendments.

A petition was deposited against the erection of GAS-WORKS in the neighbourhood of Victoria Park, from inhabitants of the east and north of London.

FRIDAY, JULY 6.

The NEATH NEW GAS Bill was agreed to, as amended by the Lords.

IMPERIAL GAS COMPANY (No. 3) Bill.—Ordered, that the Standing Orders be suspended, and that the Bill, as amended, be now taken into consideration, provided amended prints shall have been previously deposited:—the Bill was considered;—and it was ordered, That the Bill be now read the third time; whereupon the Bill was read the third time, and passed.

Legal Intelligence.

VICE-CHANCELLOR'S COURT.

MONDAY, JUNE 25.

(*Before Vice-Chancellor Sir* W. P. WOOD.)

FIELDEN *v.* THE MAYOR AND CORPORATION OF BLACKBURN.

This was a suit for the purpose of restraining the mayor and corporation of Blackburn from pouring the sewage of that town into the brook called the Blakeburn, or Blakewater, or into the river Darwen, so as to pollute these streams and occasion a nuisance.

It appeared that, since the passing of the Blackburn Improvement Act, 1854, the defendants, the local authority for carrying out the provisions of the Act, had constructed a new main sewer for the purpose of draining the town. This sewer, which intercepts and receives the greater part of the sewage, discharges itself into the Blackwater Brook about 1200 yards above the point where the brook joins the river Darwen, which is a private river flowing through the park and pleasure-grounds of the plaintiff, called Feniscowles Hall. The case made by the bill was that the new drainage works executed by the defendants polluted the river to such an extent as to occasion a most dangerous and intolerable nuisance, the river being turned into a vast open sewer, and the plaintiff's house being rendered uninhabitable.

Various grounds were taken in defence, and, among others, that the river had been always in a foul state, chiefly by the discharge of foul and heated water from the plaintiff's own mills, and that the works of the defendants, which were not as yet perfected, so far from increasing the pollution of the river, would in time do away with all nuisance whatsoever, and that none of the existing evils were fairly attributable to the defendants works. The usual objections of delay on the one hand in lying by while the works were in progress, and of undue precipitation on the other, in filing the bill without waiting until the defendants should have been able to devise some means for deodorizing the sewage in completion of their drainage system, were also urged. A great mass of evidence was adduced on either side.

Mr. ROLT, Q.C., and Mr. CHARLES HALL were for the plaintiff; Mr. DANIEL, Q.C., and Mr. T. A. ROBERTS for the defendants.

Vice-Chancellor WOOD, without hearing a reply, held that the plaintiff was entitled to an injunction to restrain the defendants from continuing the nuisance occasioned by collecting the sewage of the large and important town of Blackburn, and pouring it *en masse* into the river. The nuisance had been in effect completely admitted before the bill was filed, although it was true that this candid admission had been since withdrawn. The evidence was conclusive that a very serious nuisance existed, and that it had been occasioned by the works of the defendants. They were not entitled in the execution of the works imposed upon them by Parliament to occasion any nuisance to health or property, and if they had so done it was their business to take immediate steps to abate it. His honour, after adverting to the various defences that had been raised, granted an injunction against the defendants, to take effect from the 2nd of November, so as to give them time to take the necessary steps for abating the nuisance.

Miscellaneous News.

HOW TO SECURE CHEAP GAS FOR PERTH.

Under this heading we said, on the 7th of December last, "This is the riddle which the Perth Sphynx again propounds to the community of Perth." We admitted that our gas was cheap enough, being at the rate of 4s. 2d. per 1000 cubic feet from one company, and of 5s. from another. We had had it at these rates, we said, for four or five years, and one of the companies was under a pledge to give it at the same rate—that is, at 4s. 2d.—until Martinmas, 1866. Where, then, did the danger of dear gas lie? It lay, we said, in the prospect of one of the gas companies starving the other out of existence, and obtaining a monopoly of the field.

This prospect is more imminent now than it was then. At that time, the new gas company charged 5s. per 1000 feet, but at this rate it was not able to make ends meet. In these circumstances, it resolved to reduce the price to 4s. 2d., the rate charged by the old gas company, and this reduced rate has been in operation since the beginning of the year. Obviously, the hope and intention were to obtain more customers. In this the new gas company has been disappointed. It has, we fear, lost more than it has gained since the beginning of the year; and now, as we reported last week, it has lost the lighting of the public lamps. If, therefore, at 5s. it was not only not able to pay any dividend, but was out of pocket for current expenses, it must be in a worse position at 4s. 2d.; more especially as the price of what are called the "secondary products"—naphtha and so forth—has fallen considerably.

We need not go into the old and often-discussed question, as to how and why the new gas company has not been supported. It has not been supported from the first; it has not been supported since last January, when its gas was reduced to the price of the old company's. The public has thought fit so to order it, and the result is, the prospect of the old company at no distant day starving its rival out of existence. In these circumstances we are not surprised to hear that the new company has no objection, but the contrary, to prolong its existence by a compact with the old one, by which the

price of gas would be raised to the old familiar figure of 7s. 6d. per 1000 feet. The principal manager of the old company, we are told, objects to this. He declines to raise the rate to 7s. 6d., preferring to wait the result of the process of exhaustion under which the new company is labouring. The end, he thinks, is not far away; and as his pledge to give gas for 4s. 2d. expires at Martinmas next, he will then be at liberty to make his own terms with the public.

These are the state and prospects of the gas question in Perth. One company pays no dividend; the other, the last five years, has paid on an average less than 5 per cent., with gas at 4s. 2d. In 1861-2 the old company paid 3 per cent.; in 1862-3, 4 per cent.; in 1863-4, 5 per cent.; and in 1864-5, 5 per cent. We have not heard the per centage for the last or current year. But things have changed considerably of late, and against the profits of all gas companies. In the first place, the price of coals and of labour has risen; and secondly, the price of naphtha and other secondary products has fallen. As we have said, we need not discuss the old question as to why and how the new company has not been supported. Because it has not been, it has been pressed to the wall; and all the probabilities are, that by-and-by we shall have only one gas company in Perth.

We all know very well what the history of monopolies has been and is. Give any individual or corporation a monopoly of corn, of sugar, of ships, or of gas, and the public will have to pay monopoly prices. Thus it has been; and, in the absence of some counteractive, thus it will be. Gas companies, we may depend upon it, will sell their commodity in the dearest market; and so, with the prospect before us, the question recurs, "How to obtain Cheap Gas for Perth?" Of course, it is reasonable that the manufacturers of gas should have a fair per centage on their outlay; and what we wish, in the interest of the public, is some guarantee that that per centage shall be only a fair one. The old company has contracted to light the public lamps for five years at 4s. 2d; what are they prepared to offer to the general public?—*Perthshire Advertiser.*

BOILER INCRUSTATIONS.

(*Concluded from page 542.*)

In practice sulphate of lime can only be removed from water by undergoing decomposition—for example, by carbonate of soda, which forms carbonate of lime, which is deposited as a powder, and sulphate of soda, which remains in solution. It has been stated that as much as 1300 lbs. of incrustation has been taken from a single boiler at one time. It may seem impossible for so large a quantity of earthy matter to be deposited from waters which average only 17 grains of incrusting constituents per gallon. When it is recollected, however, what vast quantities of water pass into a locomotive boiler the possibility will be fully conceded. It was stated by a master mechanic on the road that a locomotive, in running forty miles, will take in 1800 gallons of water, equivalent to 45 gallons per mile, a quantity which seems incredible.

Accepting this statement as a basis for calculation, we have 765 grains, or more than an ounce and a half of earthy matter as a possible average of the quantity which enters the boiler per mile. Multiplying this by 1988, the average number of miles run on this section of the road by each of 56 locomotives in one month (December), we have 217 lbs. of incrusting matter entering a boiler per month, or 2604 lbs. per year. Nor is this necessarily a maximum, as some boilers receive the larger part of their water from stations furnishing water much below the average in purity.

The Effect of Incrustations.

The injurious action of the incrustations is threefold:—

1. Being very poor conductors of heat, and occupying a position between the boiler-plates and the water, they cause a great loss of heat and consequent waste of fuel. This waste is estimated at 20 per cent., and in some cases as high as even 47 per cent., of the fuel used. Nor does this waste require a very thick incrustation, a very small fraction of an inch of scale being sufficient to exert a decided influence on the quantity of fuel necessary to produce the required power. This loss of heat involves, of course, a corresponding loss of power.

2. For the same reason they cause an overheating of the boiler-plates, which often become red hot, though only separated from the water by a thin scale. Such overheating is sure to cause a rapid burning out of the metal, and may result in an explosion of the boiler should the expansion of the boiler-plates loosen and detach the scale, so as to expose the overheated surface to the water.

3. The corrosion of the metal occurs most rapidly in those parts of the boiler upon which the deposits are most liable to accumulate.

The Corrosion of the Boiler-Plates.

The only substances contained in the water, which can be supposed to act upon the iron, are the alkaline salts, chlorides of potassium and sodium, sulphates of potassa and soda, and chloride of magnesium. That these substances do affect iron is shown by introducing slips of iron and copper connected with a galvanometer into their solutions. A galvanic current is produced, which is a certain indication of chemical action; although the short duration of such an experiment precludes the possibility of any considerable corrosion of the iron.

The impression which prevails among some of the *employés* of the road, that the corrosion is due to some acid, is not confirmed by the analysis of the water. No free acid, except carbonic, exists in any one of them; and the presence of the carbonates of lime and magnesia renders the existence of any other free acid impossible.

The copper and brass tubes, used in locomotive boilers, on account of the rapidity with which they "make steam," must greatly facilitate the corrosion of the iron. The copper is rendered electro-negative, while the iron in the electro-positive condition is corroded. That the incrustations may have some influence on the corrosion is proved by the fact that the plates which suffer most are those upon which the incrustations most rapidly accumulate, the lower or "belly plates" of the boiler.

This coincidence may be owing to the fact that the deposits subside most readily in those parts of the boiler least disturbed by currents. It would be well to ascertain whether an arrangement, by which the water entering the boiler could be made to produce in those parts not directly over the flues or fire-box, would not materially diminish both the deposits and corrosion.

As a somewhat anomalous fact, it may be mentioned here, that even chemically pure (distilled) water is not adapted for "feeding" boilers. Some of the condensers used in connexion with marine boilers, for condensing the waste steam, are found to furnish water which produces effects quite similar to those noticed in the locomotive boilers. It is even stated that the addition to this water of a small quantity of water containing chloride of sodium and sulphate of lime (sea water) suffices to prevent the corrosion.

The corrosion of the locomotive boilers is not evenly distributed over the surface of the plates, but is confined to pits and grooves, which are most abundant along joints, and, n fact, wherever the surface of the metal may have been bruised. The surface of the boiler-plates is harder and less readily attacked than the interior, which it protects as the skin of an apple protects its interior from decay. In trimming down the rough edges where the plates lap and where braces are riveted to the plates, the boiler-makers are liable to cut through this hard surface with their chisels, and at these points the corrosion is most rapid.

After a careful consideration of all the facts of the case I am satisfied the corrosion of the plates is due to the saline substances already mentioned, aided by the electro-positive condition of the iron (induced by contact with the copper or brass tubes), by the presence of bulky incrustations, and by the high temperature of the water.

Means for Preventing Boiler Incrustations and Corrosion.

Numberless substances and methods have been proposed, from time to time, for preventing the bad effects of impure water in boilers. Although it is beyond the plan of this report to discuss or even to mention them all, it is important that some general idea of the principles upon which their supposed efficacy is based be given here.

Most of the methods are designed merely to prevent and remove incrustations, the opinion has been already advanced, however, that corrosion is much aggravated by the presence in the boiler of calcareous deposits. Methods which prevent incrustations must, therefore, diminish corrosion. Some of the methods to be mentioned are applied to the water before it enters the boiler; in other cases substances are introduced into the boiler itself. In most cases the salts of lime and magnesia are either precipitated in fine particles as a loose mud, or rendered permanently soluble.

Filtration, which removes suspended impurities, is in this case useless, as the salts to be removed are in solution.

Distillation is particularly recommended, and employed to a considerable extent, for marine boilers using sea water. The anomalous behaviour of distilled water has been already mentioned. This method of purification is entirely impracticable for locomotives.

Boiling expels the free carbonic acid, and causes the separation of the carbonates of lime and magnesia, and if conducted at a high temperature, under considerable pressure, results in the almost complete precipitation of the sulphate of lime. This would, however, merely transfer the incrustations from the locomotive boiler to some other vessel, and would, therefore, be valueless in this case.

Lime water is employed on a large scale at Woolwich. The lime combines with the free carbonic acid, causing the precipitation of the carbonates of lime and magnesia. The proportion of lime water added varies with the amount of free carbonic acid present. In a few hours the carbonates settle, leaving the supernatant water clear. As the lime added is also deposited as carbonate, nothing is introduced which remains in solution. The sulphate of lime is not affected. This method is readily applied and inexpensive. It merely requires extra tanks for the lime water and for settling the sediments; it is specially applicable to water containing little sulphate of lime.

Baryta water, which affects the sulphate, as well as the carbonates, has been proposed, but its high price puts it entirely out of the question.

Carbonate of Soda.—This salt precipitates the carbonates of lime and magnesia by withdrawing the free carbonic acid. It also decomposes the sulphate of lime, forming carbonate of lime, which is deposited, and sulphate of soda, which remains in solution. This is very effective and not expensive. Added in excess, however, it is said to produce priming and leakage. Carbonate of potash would answer the same purpose, but it is more expensive; caustic soda and potash behave in nearly the same manner. Carbonate of ammonia has the same effect on lime salts, but does not precipitate the magnesia. Carbonate of soda is preferable to the other substances of this class on account of its low price.

It may be advisable to employ caustic soda in some cases on account of its superior efficacy in loosening hard scales.

Chloride of Barium decomposes sulphate of lime, forming sulphate of baryta, which is deposited. This would be too expensive in this country, besides being objectionable on account of the chloride of calcium left in the water. Hydrochloric acid is sometimes added with the chloride of barium to dissolve the carbonates of lime and magnesia, and form the soluble chlorides of calcium and magnesium. In excess this acid would attack the boiler-plates.

Carbonate of Baryta decomposes the sulphate of lime, with the formation of sulphate of baryta and carbonate of lime, both of which separate as a deposit. The carbonates of lime and magnesia contained in the water are not affected. This method may be applied to water which has been freed from its carbonates by lime water, the carbonate of baryta being introduced into the boiler. Carbonate of lead, which behaves in a similar manner, has been suggested for the same purpose; larger quantities would, however, be required, and it is much more expensive.

Chloride of Ammonium.—This salt is very effective in decomposing the lime and magnesia salts, even after they have been deposited, forming soluble chlorides of calcium and magnesium, carbonate of ammonia, which is rapidly expelled with the steam, and sulphate of ammonia, which remains in solution. The quantity added should, at least, equal the quantity of carbonates of lime and magnesia and sulphate of lime present in solution.

When it is desired to loosen a considerable deposit, hydrochloric acid may be cautiously added at the same time. The acetate and nitrate of ammonia resemble the chloride in their action, but are neither as powerful nor as low priced.

Chloride of Tin has been used by a French engineer. He employed about 8 lbs. per week for an engine working 12 hours daily. He recommends for large boilers 1 lb. of the salt for every 16 cubic feet of water. The chloride of tin is decomposed, forming an insoluble basic salt, which is deposited, and a soluble acid salt, which dissolves the lime and magnesia sediments.

It is not equal to chloride of ammonium in effectiveness, and is far too expensive for general use.

Silicate of Soda, Phosphate of Soda, Arseniate of Soda, &c., have been recommended for purifying water for special purposes, as for tanning and dyeing. They are not at all applicable in the present case.

Hyposulphite of Soda has been proposed on account of its property of increasing the solubility of sulphate of lime. It would be too expensive in practice.

Catechu, Nutgalls, Oak Bark, Shavings and Sawdust, Tan Bark, Tormentilla Root, Mahogany, Logwood, &c.—These substances all contain more or less tannic acid, associated with soluble extractive and colouring matters. When they are introduced into the boiler, the soluble constituents are dissolved by the water, and basic tannate of lime is formed, which separates as a loose deposit, which does not adhere to the sides of the boiler. It is preferable to use the aqueous extract, as sawdust, chips, &c., are liable to find their way into the cocks and tubes, although they act mechanically, receiving incrustations which would otherwise fasten themselves on the sides of the boiler. In selecting one of these substances, one would endeavour to secure the largest quantity of tannic acid and soluble extractive matter for the lowest price. Some of these substances are said to be very effective, one half pound of catechu being sufficient for 100 cubic feet of water. From 4 to 6 lbs. of oak chips have been recommended per horse power, or a half bushel of mahogany chips for every 10-horse power.

Potatoes, Starch, Bran, Linseed-meal, Gum, Dextrin, Irish Moss, Slippery Elm, Marshmallow Root, Glue, &c.—These substances form, sooner or later, a slimy liquid in the boiler, which prevents more or less completely the settling and hardening of the deposits. Some of them may even hold the lime and magnesia in solution. Potatoes have been used for many years wherever steam-engines are employed; half a peck or a peck are thrown into the boiler weekly. Linseed-meal mixed with chopped straw was employed on a German railway, a peck at a time being introduced into each boiler. Some writers object to these organic substances, on the ground that they are liable to cause frothing.

Sugar, Molasses, Corn or Potato Syrup.—Both cane and grape sugar form soluble compounds with lime salts, and, consequently, prevent their separation as incrustations. One engineer found that 10 lbs. of brown sugar protected his boiler for two months; another, that 6 lbs. of corn starch syrup had a similar effect; another used molasses with success, introducing a gallon at a time.

Fatty Substances.—One writer used whale oil to prevent incrustations, 2 or 3 gallons at a time. Others smear the inside of the boiler with various mixtures of a fatty character. Stearine, mixed with wood ashes, charcoal, and tar, has been recommended, or tallow with soap and charcoal diluted with oil or tar, or tallow and graphite. This plan could not well be applied to a locomotive boiler with its numerous tubes, even though it should prove effective in cylinder boilers.

Tar, Pitch, and Resin have been applied in a similar manner.

Mechanical Agents of various kinds have been employed with doubtful success to prevent the hardening of deposits on the sides of the boilers. By offering solid particles suspended in the water, they serve as nuclei for the accumulation of the calcareous sediments. Clay was formerly used. It was carefully sifted and washed, and introduced, 5 or 6 lbs. at a time, into the boiler. It was found, however, that hard silicious particles were sure to find their way into the cylinder, scratching its surface.

Sawdust, Chips, Shavings, Straw, Powdered Glass, Scraps of Sheet Iron, and Wire-Gauze, have also been used, and generally abandoned.

A Wire Gauze Lining has been proposed, and I believe patented, as a protection against incrustations. Such an arrangement may perhaps be useful in a cylinder boiler, but could not well be applied to the tubular boilers of locomotives.

Blowing-off.—The frequent blowing-off of small quantities of water, say a few gallons at a time, is undoubtedly one of the most effective and simple methods for removing sediments and preventing their hardening on the sides of the boiler.

The water entering the boiler should be directed in such a way as to sweep the loose particles towards the blow-off cocks, that when these are open they may be carried out with the water. This blowing-off should take place at least two or three times daily, perhaps much oftener.

Great care should be taken to avoid emptying the boiler while there is still fire enough to bake the muddy deposits.

Washing out frequently is very efficacious.

Metallic zinc, attached to the plates of the boiler so as to secure actual contact, is probably one of the best preventives of corrosion. As already mentioned the iron protects the copper and brass tubes by rendering them electro-negative, being itself much more rapidly corroded in consequence. Zinc bears the same relation to iron that iron does to copper, and may be made, therefore, to bear the corrosion. Rolled zinc is preferable to slabs, as the latter are very crystalline, and are consequently very unevenly corroded, soon becoming brittle and working loose.

Electro-magnetic inductors have been proposed. One has been patented by Parry, and another, I believe, by A. F. Porter. It is claimed that these inventions prevent corrosion and incrustations, though I have seen no evidence either in their favour or against them, nor do I know their principle.

G. F. Bousfield's patent for protecting iron from wear by galvanic action, dated February 19, 1862, consists in insulating electro-negative bodies, copper, &c., by washers or packing of india-rubber, or other non-conducting substances. I know nothing of its merits.

Incrustation powders, bearing generally the names of their proprietors, are extensively advertised and sold; they are either worthless or are sold at such extravagant prices as to make their use extremely ill advised. I have examined several of them. Those which are at all valuable consist of one or more of the substances already mentioned, and the only novel result of their use is the payment of many times the commercial value for a fair article.

One of which, put up in tin boxes, containing about 1 lb., at 2 dols. 50 c. each, contains

Carbonate of lime	95·35
Carbonate of magnesia	0·67
Oxide of iron	4·15
	100·17

It differs little from some of the incrustations in composition, and is of no value whatever. Another contains

Logwood	75·00
Chloride of ammonia	15·00
Chloride of barium	10·00
	100·00

This is a very good article, but at the price for which it is sold it cannot be used in quantities sufficient to produce much effect. In fact, chloride of barium is too expensive to be used in this country at all.

In conclusion, I would advise—

1. The use of the purest waters that can be obtained—rain water wherever possible.
2. Frequent use of the blow-off cock.
3. That the boilers never be emptied while there is fire enough to harden the deposit.
4. Frequent washing out.
5. Experiments on the efficacy of zinc, lime water, carbonate of soda, carbonate of baryta, chloride of ammonium, some substance containing tannic acid, linseed-meal, and the electro-magnetic inductor.

ON THE MECHANICAL EQUIVALENT OF LIGHT.

Professor Thomsen, of Copenhagen, has given an ingenious method of determining the mechanical equivalent of light based upon the principle that light may be converted into heat by absorption when incident upon a black surface without lustre. The heat produced was measured by means of a Melloni's apparatus, the indications of which were reduced to absolute measure. To effect this reduction a glass globe filled with warm water was placed at different distances from the thermo-electric battery. The globe contained 1351 grammes of water (including the water value of the glass). At a temperature of 50° C. the cooling of the globe was 0°·185 per minute, so that $1351 \times 0°{\cdot}185 = 250$ units of heat were lost in all. Of this quantity, however, according to Dulong's formulæ, only 102 units of heat per minute were lost by radiation alone, the external temperature being 17° C. This source of heat placed at a distance of 0·8 mètre from the thermopile produced a constant deviation of 17°·8; hence any source of heat or light, which at a distance of 0·8 mètre from the thermopile produces a deviation of 17°·8 C., radiates 102 units of heat per minute; and since the deviations of the needle within certain limits are proportional to the radiation, it follows that under these circumstances a deviation of 1° corresponds to a radiation of 5·76 units of heat per minute. By placing the globe at different distances from the thermopile and noting the deviations of the needle, similar factors were obtained for some other distances at which afterward the different sources of light were placed. A candle was then placed at a distance of 0·8 mètre from the thermopile and a constant deviation of 36°·5 obtained. Hence the total radiation of a candle burning 8·2 grammes of spermaceti per hour was $5{\cdot}36 \times 36°{\cdot}5 = 210$ units of heat per minute. Since the corresponding quantity of spermaceti evolves about 1400 units of heat per minute, it follows that only 1-7th of the whole quantity of heat evolved is given off as radiant heat and light, the other 6-7ths being carried off by heated air. Other and more intense flames were then tried; the results were as follows:—

Nature of the Flame.	Intensity of Light.	Radiation for Unit of Light per Minute.
Spermaceti candle	1	210
Gas-flame	1·2	201
,,	7·7	199
Moderator lamp	8·6	199

Hence the radiation of the flame is proportional to the intensity of the light, and amounts, for the unit of light (8·2 grammes of spermaceti per hour), to about 200 units of heat per minute. This is the action of the entire radiation, and to determine the portion due to the light alone the rays of heat must be eliminated. The author found by experiment that the invisible rays do not pass through a layer of water 0·2m. in thickness, or at least to so small an extent as to exert no appreciable influence on the result. Further experiments then showed that the absorption of light due to a layer of water 20 centimètres in thickness amounted to 0·13. A glass vessel, with parallel sides of mirror-glass enclosing a layer of water 0·2m. in thickness, was placed between the flame and the thermopile, the flame being at the same distance as in the first experiments. The deviation of the needle was therefore due exclusively to the heat produced by the rays of light. The results were as follows:—

Flame.	Intensity of Light.	Radiation of Heat and Light per Minute for the Unit of Light.	Radiation of Light per Minute for the Unit of Light.
Spermaceti candle	1	210	4·4
Moderator lamp	6·25	—	3·9
,, ,,	8·6	199	4·1
Gas-flame	7·7	199	4·2
,,	1·2	201	3·7

The mean is 4·1 units of heat per minute. Hence in words the result is this:—A flame, the light of which is equal in intensity to that of a candle which consumes 8·2 grammes of spermaceti per hour, evolves per minute in the form of light a quantity of heat which would raise the temperature of 4·1 grammes of water 1° Cent. The mechanical equivalent of light reduced to mechanical measure may then be expressed as follows:—The unit of work per second, or one kilogramme raised to the height of one mètre per second, is equal to that contained in the rays of light which proceed per second from a source of light the intensity of which is 34·9 times as great as that evolved in a candle which consumes 8·2 grammes of spermaceti per hour.

This is consequently the maximum of the mechanical equivalent of light, and may be reduced by later researches. The author proposes to continue his investigations, using light of greater intensity, like that of the sun or of the electric spark.—*Pogg. Ann.*, CXXV., 348.

ANALYSIS OF THE METROPOLITAN WATERS FOR JUNE, 1866, BY PROFESSOR FRANKLAND, F.R.S., OF THE ROYAL COLLEGE OF CHEMISTRY:—

Names of Water Companies.	Number of Houses supplied in May, 1866.	Average daily Supply of Water in Gallons during May, 1866. (See Note.)	Solid Matter in 100,000 parts of the Waters.	Organic and other Volatile Matter included in column 4.	Amount of Oxygen required for oxidation of Organic Matter.	Total hardness.
Thames Water Companies.						
Chelsea	26,463	7,385,800	25·25	0·85	·0360	16·5
West Middlesex	35,707	8,397,709	24·82	0·97	·0360	16·2
Southwark and Vauxhall	73,809	12,175,000	24·74	0·93	·0420	15·7
Grand Junction	25,636	8,855,729	24·82	0·91	·0368	16·2
Lambeth	36,008	8,904,800	26·63	1·01*	·0424	16·8
Other Companies.						
Kent	32,766	6,025,420	39·28	1·50	·0076	25·4
New River	111,958	23,092,000	21·55	0·91	·0252	13·7
Do. (after filtration through animal charcoal)	—	—	19·57	0·30	·0072	9·5
East London	88,340	18,357,000	26·22	1·26	·0264	15·7
South Essex	750	160,000	38·52	1·66	·0080	23·1

Note.—The water includes the supply for manufactures and for various purposes other than domestic consumption. This return, as compared with that for the previous month, shows an increase of 267 houses and an increase of 3,638,005 gallons of water supplied daily. The table may be read thus:—100,000 lbs. of the Chelsea water contained 25·25 lbs. of solid matter, of which 0·85 lb. of organic and other volatile matters was driven off by incineration. 0·0360 lb. of oxygen was required to oxidize the organic matter in the said quantity of Chelsea water. Of the solid matter 16·5 lbs. were carbonate of lime or its equivalent of hardening salts.† The fourth column of this table contains the amount of solid matter left on evaporation and desiccation at 120 deg. C.—130 deg. C. (248 deg. F.—266 deg. F.) The results are recorded in 100,000 parts. By moving the decimal point one place to the right the above figures express in milligrammes the quantities contained in one kilogramme of the several waters. The whole of the waters were free from turbidity when drawn from the companies mains.

* By mistake, this number was given as 2·14 in the report of the Registrar-General.

† The degree of hardness hitherto employed by chemists is that first proposed by Dr. T. Clark, viz., one grain of carbonate of lime, or its equivalent, of hardening salts, in one imperial gallon of water, or one part in 70,000. The degrees of hardness used in the above table are readily converted into Clark's degrees by multiplying by seven, and then moving the decimal point one place to the left.

Composition and Quality of the Metropolitan Waters, in June, 1866.—The following are the returns of the Metropolitan Association of Medical Officers of Health:—

Names of Water Companies.	Tot. solid Matter per gal.	Loss by Ignition*	Oxidizable Organic Matter.†	Hardness.	
				Before Boiling.	After Boiling.
Thames Water Companies.	Grains.	Grains.	Grains.	Degrees.	Degrees.
Grand Junction	18·05	0·67	0·62	13·5	3·0
West Middlesex	17·02	0·71	0·40	13·0	3·0
Southwark and Vauxhall	18·12	0·68	0·62	13·5	4·0
Chelsea	17·73	0·74	0·48	13·5	3·5
Lambeth	18·60	0·80	0·72	13·5	3·0
Other Companies.					
Kent	28·23	1·00	..	17·5	8·0
New River	16·06	0·56	0·14	12·0	3·0
East London	17·70	0·94	0·23	12·5	4·0

* The loss by ignition represents a variety of volatile matters, as well as organic matter, as ammoniacal salts, moisture, and the volatile constituents of nitrates and nitrites.

† The oxidizable organic matter is determined by a standard solution of permanganate of potash—the available oxygen of which is to the organic matter as 1 is to 8; and the results are controlled by the examination of the colour of the water when seen through a glass tube two feet in length and two inches in diameter.

Improvements in Gas Lanterns.—Few who have travelled upon the Metropolitan Railway will have failed to notice the excellent workmanship displayed in everything connected with it, from the most important to the most trifling article, the result being a degree of lightness and elegance which could scarcely be expected in so unfavourable a position as the continuous tunnel which forms the line; and there is probably nothing that more speedily strikes the eye than the beautiful globe lamps with which the stations are lighted. Recently, however, a vast improvement has been introduced even in these, Mr. John Joseph Parkes, of London Street, Paddington, the gas engineer of the company, having invented a new lamp with improved door, which renders it, as nearly as may be, perfect. It will have been observed that the framework is so light as to cause the lamp to appear almost like a globe of glass, yet Mr. Parkes has succeeded in giving this apparently fragile structure such strength that it will bear a man's weight without giving way, so that the lamps once fixed are maintained quite as cheaply as the most unsightly lantern ever constructed. The globe is divided by six metallic ribs, which ribs are held in position by three rings or bands, the one central, and, of course, equal in size to the circumference of the globe, and the other two small and holding together their top and bottom extremities. Both ribs and bands are duly strengthened with steel rods, for which a groove is formed in the thinner metal which holds the glass. Owing to the general lightness of the structure, the door, however light may be the hinges and fastenings used, has always had a very clumsy appearance, and a little carelessness on the part of the porters cleaning sufficed to break off the door and otherwise damage the lamp. These difficulties have been entirely removed by Mr. Parkes's last invention, which may now be seen applied to lamps at Aldersgate and Moorgate Street stations. He uses a sliding door, which is held in its place by a ring, within the upper band, and a clip, which grasps the central one. By this arrangement the utmost neatness is secured—indeed, it is difficult to find the door without carefully looking for it, and as there remains no part likely to be injured, even by carelessness, the advantages possessed by the lamp will be readily appreciated.

Dr. Hillier's Report on the Gas supplied by the Imperial Company to the Vestry of St. Pancras during the Month of June, 1866:—

Maximum light estimated by sperm candles according to the Act	15·1
Minimum light—sperm candles	12·9
Average light—sperm candles	13·8
Traces of ammonia, indicated by turmeric test-paper	Usually present.
Traces of sulphuretted hydrogen, indicated by lead test-paper	None.

The illuminating power of the gas has been maintained as usual. There is still more ammonia than the Act sanctions. In regard to sulphur, none has been detected in the form of sulphuretted hydrogen; in other forms, on one occasion there was in 100 cubic feet less than 14 grains, and on another it was just 20 grains. This is an improvement since last month.

Share List of Metropolitan Gas Companies.

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
8000	10	Anglo-Romano	10 0 0	9 0 0	11 to 13
5000	20	Bahia (Limited)	20 0 0	4 0 0	16 10 0
1000	20	Do., preference	20 0 0	10 0 0	27 10 0
750	20	Do., do., redeem.	10 0 0	10 0 0	12 10 0
30000	5	Bombay (Limited)	5 0 0	£5 intr.	4 5 0
10000	5	Do., third issue	4 0 0	£5 intr.	3 5 0
10000	20	British, Limited (Norwich, Huis-Sculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbridge, & Holywell.)	20 0 0	10 0 0	29¾ to 29¼
12000	50	*Chartered*	50 0 0	10 0 0	63¼ to 64
6000	50	Do.	35 0 0	10 0 0	42 to 42½
10000	20	*C. of London*, Ash.	20 0 0	10 0 0	26:0:28
10000	10	Do., B shares	10 0 0	4 0 0	7 to 7¼
8000	10	Do., new shares	10 0 0	10 0 0	13 to 14
25000	25	City of Moscow (L)	12 10 0	£7 intr.	4¼ to 6¼
		Colonial & General			
17490	25	*Commercial*	25 0 0	10 0 0	36 to 37
5000	20	Continental G. & W.	6 0 0	6 0 0	
2500	20	Continental Union	20 0 0	8 0 0	17 to 18
17500	20	Do.	10 0 0	8 0 0	8 to 9
5827	5	County & Gen. (L)	5 0 0		
2000	5	Do., preference (Pater, Pembroke, Ely, Lea Bridge, Northfleet, Walton, & Ware.)	5 0 0		
5000	10	*Crystal Pal. Dist.*	10 0 0	10 0 0	14¼ to 15
5000	10	Do.	1 0 0	7 0 0	1 7 6
10000	10	Do., preference	10 0 0	6 0 0	12½ to 13

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
4000	50	*Equitable*	50 0 0	10 0 0	73 0 0
4000	25	Do., new shares	25 0 0	10 0 0	36 to 37
23406	10	European (Lim.)	10 0 0	10 0 0	12½ to 12⅝
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	10 0 0	6¼ to 6¼
20000	10	*Great Central Gas Consumers*	10 0 0	10 0 0	12¼ to 13
5000	10	Hong Kong (Lim.)	10 0 0		8 to 10
26000	50	*Imperial*, old sh.	50 0 0	10 0 0	71 to 72
1300	100	Do., bonds	£100	10 0 0	180 to 185
7000	25	Imperial Austrian	10 0 0		
28000	50	*Impl. Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwp., Bordeaux, Brussels, Cologne, Frankfort-on-M., Haarlem, Stolberg, Toulouse, & Vienna	43 15 0	16 0 0	85 0 0
3000	40	*Independent*	40 0 0	10 0 0	60 to 65
3000	10	Do.	10 0 0	5 0 0	7 to 9
3000	20	Do.	12 10 0	7 10 0	13 to 14
6886	50	*London*	50 0 0	10 0 0	68¼ to 69¼
5519	25	Do., 1st pref.	25 0 0	6 0 0	28 to 29
568	50	Do., 2nd pref.	50 0 0	6 0 0	
219	50	Do., 3rd pref.	50 0 0	6 0 0	
18781		Do., 1st pref. sh		6 0 0	
11828		Do., 2nd pref. sh		5 0 0	

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
12000	5	Malta & Medit. (L.)	5 0 0	3 0 0	
30000	5	Oriental, Calcutta	5 0 0	8 0 0	4½ to 5
30000	5	Do., new shares	0 10 0	8 0 0	⅝ to ¼
10000	5	Ottoman (Limited)	5 0 0		2 to 4
10000	10	Parà (Limited)	10 0 0	£6 intr.	9½ to 9¾
27000	20	*Phœnix*	20 0 0	10 0 0	24½ to 25½
3600	100	Do., new	15 0 0	7 10 0	15 0 0
144000	Sk.	Do. (capit. profits)		5 0 0	80 0 0
5000	20	*Ratcliff*	20 0 0	10 0 0	28 to 30
	20	Rio de Janeiro (L.)	20 0 0	10 0 0	20¼ to 21¼
6959	5	Singapore (Lim.)	5 0 0	3 0 0	
2000	5	Do., preference	5 0 0	7 10 0	
		Shanghai			
4800	50	*Sth. Metropolitan*	50 0 0	10 0 0	76 to 78
15000	10	*Surrey Consumers*	10 0 0	10 0 0	13¾ to 14
10000	10	Do., new	5 0 0	10 0 0	6 to 6¼
9000	50	United General (Dublin & Limerick)	50 0 0	4 12 0	29 to 31
10000	10	*Victoria Docks*			
3000	10	*Wandsworth & Putney*	10 0 0	7 10 0	13¼ to 14
20000	10	Western (Limited) A shares	10 0 0	10 0 0	14¼ to 14¾
10000	10	Do., B shares	5 0 0	10 0 0	8¾ to 9
10000	10	Do., C shares	3 0 0	10 0 0	5½ to 6
20000	10	Do., D shares	1 0 0		1¼ to 2
8000	5	*West Ham*	5 0 0	7 10 0	6 10 0
6000	5	Do., new shares	3 0 0	7 10 0	3 15 0
551	10	West London Junction (Lim.)	10 0 0	6 0 0	
520	10	Do., preference	10 0 0	6 0 0	

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1½ in.	2 in.	2½ in.	3 in	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1, F.O.B.	4 0 0	2 17 6	2 12 6	3 10 0	4 0 0
1¼ and 2-inch Socket-pipes	7 10 0	6 0 0	6 15 0	6 15 0	7 10 0
2½ and 3-inch ditto	7 0 0	6 0 0	6 5 0	6 10 0	7 0 0
4 and 5-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 10 0
6 inches and upwards ditto	6 5 0	5 0 0	5 10 0	5 15 0	6 5 0
Retorts, 1st fusion, hot blast	6 0 0	—	5 5 0	5 10 0	6 0 0
Ditto, 2nd ditto, cold ditto	7 0 0	5 15 0	5 15 0	6 0 0	7 0 0
Tank-plates, ¼ thick and above	6 10 0	5 10 0	5 10 0	5 15 0	6 5 0

WROUGHT-IRON TUBING,

Subject to 50 per cent. Discount.

	2 in.	1¼ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 feet—per foot		1 0	0 10	0 7	0 5	0 4½
Ditto ditto, from 6 inches to 18 inches—each	2 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—

GAS COALS.—*Per Ton.*

Newcastle.—Unscreened:—

East Castle, Haswells, Nettlesworth Primrose, and South Pelaw	6s. 6d.
Felling, North Pelton, Redheugh Main, Walker's Primrose, West Wear, and Whitwell Primrose	6 9
Burnhope, Craghead, Charlaw, Derwent, Edmondsley, Eighton Moor, Hartlepool Pelaw, Holmside, Lambton's Gas, Lanchester Pelaw, Medomsley, Mickley, New Pelaw, New Pelton, Pelaw Main, Ravensworth, South Moor Pelton, South Leverson, Townley Main, Tyne Main, West Pelaw, Wearmouth Hutton, and Witton	7 0
Peareth, Ravensworth Pelaw, Waldridge, West Garesfield, and West Pelton	7 3
Brancepeth, Dean's Primrose, Pelton, South Peareth, Stella, Urpeth, Washington Hutton, and West Leverson	7 6
Ramsay's Newcastle Cannel	20 0
Wigan Cannel (at Liverpool)	17 0
Scotch Cannel:—	
Boghead (at Leith)	30 0
Kirkness, best (at Burntisland)	28 6
Capeldrae, 1st quality (at ditto)	28 6
Ditto, 2nd ditto (at ditto)	18 6
Lesmahago (at Glasgow)	29 0
Ditto (at Granton)	30 0
Arniston	27 6
Wemyss	20 0
Haywood, Wilsontown (at Granton)	18 0
Pirnie	14 0
Lothian's Cannel (at Leith)	25 0
Myles' Cannel	21 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton:—

Chatham and Rochester	5s. 9d
Cork	8s. 6d. to 9 9
Dover, Folkestone, and Ramsgate	7 6
Dublin	9s. 6d. to 9 6
Exeter Quay	8 0
Ipswich	5 6
London (from Leith)	8 0
London (Pool)	6 0
Lowestoft and Yarmouth	4 6
Portsmouth & Southampton	7 0
Plymouth	7s. 3d. to 7 9
Shoreham	6 6
Whitstable	6 3
Weymouth	7 6
Foreign.—Per Keel:—	
Barcelona	21 0
Bordeaux	13 10
Boulogne and Calais	7 10
Cadiz	16 0
Cronstadt	—
Copenhagen	8 0
Genoa	21 0
Hamburg	8 0
Havre de Grace	9 10
Leghorn	20 0
Lisbon	16 0
Rotterdam	£7 10s. to 8 0
Stettin	10 6
Trieste	—
Venice	—

SUNDRIES.

Best Nstle. Fire-bks., p. 1000, £2 10s. to £2	15 0
Cliff's Fire-bks. (at Wortley), p. 1000	2 15 6
Ingham's ditto (at Wortley), p. 1000	2 15 0
Fire-clay Retorts, p. ft. run, 5s. 6d. to	0 7 0
Tough Cake Copper, p. ton	89 0 0
English Pig Lead, p. ton	20 5 0
Welsh Bar Iron (in London), p. ton	7 2 6
Foreign Spelter, p. ton	22 10 0
English Block Tin, p. ton	85 0 0
Banca, p. ton	78 0 0
Tarred Rope Yarn, p. cwt.	1 0 0

Share List of Provincial Gas Companies.

(Directors and Managers of Gas-Works are earnestly requested to enable us to rectify any errors and fill up the omissions in the following List.)

The Companies whose names are printed in italic type are incorporated by Act of Parliament.

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£	**ENGLAND.**	£ s d	£ s d	£ s d
360	5	Aberavon (Lim.)	5 0 0	6 0 0	5 0 0
		Aberdare			
		Aberdovey			
400	5	Abergele (Lim.)	5 0 0	4 0 0	5 0 0
		Aberystwith			
530	10	Abingdon	10 0 0	6 0 0	12 0 0
1050	10	*Accrington G. & W.*	10 0 0	& Bns.	15 0 0
1050	10	Do., new shares	10 0 0		15 0 0
2100	5	Do., do.	5 0 0		7 10 0
2100	5	Do., do.	1 0 0		1 10 0
2100	2½	Do., do.	0 10 0		0 15 0
1200	5	Airdale (Limited)	5 0 0	10 0 0	8 10 0
300	5	Do., new shares	0 10 0	8 0 0	
24	75	Alcester	75 0 0	4 0 0	80 0 0
128	10	Aldborough (Lim.)	10 0 0	5 0 0	
269	10	Alderney	10 0 0	5 0 0	11 0 0
300	6	Alfreton	6 0 0	5 0 0	5 10 0
		Alnwick			
		Alston Moor			
250	10	Alton	10 0 0	10 0 0	12 0 0
1600	5	Altrincham	5 0 0	6 0 0	6 0 0
		Amersham			
		Amlwch (Lim.)			
170	10	Ampthill	10 0 0	4 0 0	9 0 0
350	10	Andover	10 0 0	6 0 0	12 0 0
358	5	Appleby	5 0 0	2 10 0	2 15 0
260	10½	Arundel	10 10 0	7 10 0	13 0 0
250	10	Ashbourne, Derby.	10 0 0	6 0 0	13 10 0
292	5	Ashburton	5 0 0	5 0 0	
84	30	Ashby-de-la-Zouch	30 0 0	6 0 0	
700	10	Ashford (L.), Kent	10 0 0	6 0 0	11 10 0
1600	30	*Ashton-und-Lyne.*	30 0 0	10 0 0	60 0 0
		Aspatria			
590	5	Atherstone	5 0 0	9 0 0	8 10 0
		Attleborough			
		Axminster			
200	20	Aylesbury	20 0 0	5 0 0	21 0 0
150	10	Aylsham (L.), Nrfk	10 0 0	5 0 0	12 10 0
3093	10	*Bacup (Rossendale Union)* ordinary	10 0 0	& Bns. 8 10 0	16 0 0
600	10	Do., preference	10 0 0	8 10 0	16 0 0
2597	10	Do., new issue	6 0 0	8 10 0	10 0 0
300	5	Bakewell	5 0 0	8 0 0	8 0 0
200	10	Baldock	10 0 0	5 0 0	10 0 0
1000	10	Banbury (Limited)	10 0 0	7 10 0	15 0 0
2650	10	*Bangor Gas & Wr.*	10 0 0	7 10 0	12 0 0
		Barmouth (L) £1500			
260	10	Barnard Castle	10 0 0	5 10 0	10 15 0
800	5	Barnet	5 0 0	6 0 0	5 10 0
		Barnsley £6000		7 10 0	
109	20	Barnstaple	20 0 0	7 10 0	
		Barrow-in-Furness Gas and Water		& Bns.	
1158	2	Barton-on-Humb.	2 0 0	5 0 0	2 0 0
120	25	Basingstoke	25 0 0	8 0 0	35 0 0
120	10	Do.	10 0 0	8 0 0	14 0 0
2500	16	*Bath*, A shares	16 0 0	8 0 0	} 38 5 0
2500	8	Do., B shares	8 0 0	7 0 0	united
2500	10	Do., C shares	10 0 0	7 0 0	14 15 0
5000	10	Do., D shares	2 0 0	7 0 0	3 10 0
		Battle £2000		6 0 0	
56	26¾	Bawtry	26 12 6	6 0 0	25 0 0
		Beaminster			
710	10	*Beccles Gas & Wr.*	10 0 0	2 10 0	
		Bedale, Yorkshire.			
300	30	*Bedford*	25 0 0	4 0 0	20 0 0
390	10	Bedworth	10 0 0	5 0 0	10 0 0
300	3	Belford	3 0 0		1 10 0
350	10	Belper	10 0 0	10 0 0	14 0 0
		Berkhampstead			
1080	10	Berwick & Tweedmouth	10 0 0	10 0 0	16 0 0
120	20	Bewdley	16 0 0	5 0 0	16 0 0
200	10	Bicester	10 0 0	5 10 0	11 0 0
		Biddulph, Bradley Green, and Black Bull (Limited)			
330	10	Bideford	10 0 0	6 0 0	10 10 0
		Biggleswade			
		Billericay			
6000	5	*Bilston*	5 0 0	8 0 0	6 12 6
200	10	Bingham	10 0 0	4 0 0	
		Bingley £7400		4 0 0	
		Birchington (Lim.)			
1200	80	*Birmingham*, A shares	80 0 0	9 0 0	135 0 0
400	8	Do., B shares	8 0 0	9 0 0	13 10 0
3750	40	Do., new shares	40 0 0	7 10 0	56 10 0
2400	50	*Birmnghm. & Staff.*	50 0 0	10 0 0	96 0 0
2400	25	Do., new shares	25 0 0	10 0 0	48 0 0
7020	20	Do., do.	20 0 0	10 0 0	38 10 0
12500	28	Do., do.	8 0 0	7 10 0	13 0 0
230	16	*Birstall*	12 0 0	12*s.* 6*d.*	12 0 0
		Bishop's Auckland		per sh.	
180	10	Bishop's Castle	10 0 0	5 0 0	10 0 0
230	10	Bishop's Stortford	10 0 0	5 0 0	10 0 0
		Bishp's Wlthm (L)			
6000	15	*Blackburn*, A sh.	15 0 0	9 0 0	27 0 0
6000	15	Do., B shares	2 0 0	6 15 0	3 10 0
		Blaenavon G. & W.			
		Blandford			
		Blyth & Cowpen			
		Bodmin			
		Bodmin Consumers			
		Bognor			
100	10	Bolsover	10 0 0		10 0 0
3909	16½	*Bolton*	16 10 0	10 0 0	40 0 0
7466	16½	Do., new shares	8 0 0	6 10 0	
		Boroughbridge (L)			
800	10	*Boston*	10 0 0	8 10 0	
1200	10	Do., new shares		8 10 0	
	5	Boston Spa (Lim.)	5 0 0	6 10 0	5 10 0
		Botesdale (L), Suff.			
200	5	Boughton Blean	5 0 0	5 0 0	5 0 0
193	10	Bourn	10 0 0	5 0 0	
		Bournemouth Gas and Water			
160	10	Brackley	10 0 0	6 0 0	10 0 0
		Bracknell (Lim.)			
		Bradford, Wilts			
25		*Bradford, Yorksh.*	25 0 0	10 0 0	49 0 0
		Braintree			
		Brampton, Cumb.			
		Brandon, Suffolk			
579	10	Brecon (Limited)	10 0 0	10 0 0	18 to 20
897007	Sk.	*Brentford*	All.	5 10 0	124 0 0
2000	20	Do., A shares	1 0 0	7 10 0	
2187	20	Do., preference	20 0 0	5 0 0	20 0 0
313	20	Do.	5 0 0	5 0 0	5 0 0
		Brentwood			
		Bridge, near Cant.			
		Bridge-end, Glam.			
		Bridgenorth (L)			
200	50	*Bridgwater*	50 0 0	7 0 0	50 0 0
520	10	Bridlington (L)	10 0 0	7 10 0	12 10 0
450	10	Bridport	10 0 0	7 10 0	12 0 0
6000	5	*Brierly Hill*	5 0 0	4 0 0	5 2 6
		Brigg			
		Brightlingsea (L)			
3375	20	*Brighton*	20 0 0	8 10 0	
675	20	Do., new shares	4 0 0	8 10 0	
4020	20	*Brighton & Hove*	20 0 0	9 0 0	
		Brimscombe (L)			
204500	Sk.	*Bristol United*	Stock.	9 10 0	178 to 180
300	5	Briton-ferry	5 0 0		
150	8	Brixham	8 0 0	5 0 0	
		Broadstairs			
2000	10	*Bromley*, Kent	10 0 0	8 0 0	14 10 0
3000	10	Do., new shares	3 0 0	8 0 0	4 4 0
		Bromsgrove			
100	10	Bromyard (Lim.)	10 0 0		
		Broughton			
120	10	Bruton	10 0 0	4 0 0	8 to 9
		Brymbo			
100	25	Buckingham	25 0 0	6 0 0	26 to 27
		Buntingford (Lim.)			
500	1	Burley-in-Wharfdale (Limited)	1 0 0	5 0 0	1 1 0
		Burnham, Bucks			
		Burnham (L) Essex			
		Burnham, Somers.			
1600	5	*Burslem and Tunstall*	5 0 0	10 0 0	9 0 0
2560	5	Do., new shares	5 0 0	7 10 0	7 0 0
440	2½	Burton, Westmoreland (Limited)	2 10 0		
1200	10	*Bury St. Edmnd's*	10 0 0	10 0 0	17 10 0
1800	10	Do., new shares	3 0 0	7 10 0	4 4 0
303	10	Buxton (Limited)	10 0 0	7 10 0	14 0 0
150	10	Caistor	10 0 0	7 0 0	12 0 0
187	5	Callington	5 0 0		5 0 0
215	10	Calne, Wilts	10 0 0	6 0 0	10 0 0
		Calverley (L) York.			
		Camborne			
600	50	*Cambridge*	50 0 0	10 0 0	90 0 0
160	12½	Do., new shares	12 10 0	10 0 0	22 10 0
640	8½	Do., do.	4 0 0	10 0 0	6 0 0
240	50	*Canterbury Gas & Water*	50 0 0	} £6	45 to 50
240	25	Do., new shares	25 0 0		22 to 25
240	12½	Do., do.	12 10 0		11 to 12½
240	6¼	Do., do.	6 5 0		5 to 6¼
400	25	*Cardiff*, A shares	25 0 0	10 0 0	48 0 0
1200	25	Do., B shares	25 0 0	8 0 0	38 0 0
400	25	Do.	10 0 0	8 0 0	8 0 0
		Cardigan (Limited)			
160	25	Carmarthen	25 0 0	5 0 0	30 0 0
		Carnarvon			
		Carshalton			
200	6	Castlecary	6 0 0		5 0 0
200	10	Castle Donnington	10 0 0	6 0 0	12 14 0
249	5	Castleford	5 0 0	5 0 0	5 0 0
400	5	Castletwn, I. of M.	5 0 0	5 0 0	5¼ to 5¼
620	2	Cawood (Limited)	2 0 0	4 0 0	
		Chatteris			
300	10	Cheadle	10 0 0	6 0 0	12 10 0
200	50	Chelmsford	50 0 0	8 0 0	70 0 0
200	25	Do., new shares	25 0 0	8 0 0	35 0 0
2500	16	*Cheltenham*, A shares	16 0 0	8 0 0	
2500	8	Do., B shares	8 0 0	7 0 0	
		Do., new shares		7 0 0	
500	10	*Chepstow*, A sh.			
200	10	Do., B shares			
600	5	*Chertsey Consumrs*	5 0 0	5 0 0	6 15 0
600	1½	Do.,	1 10 0	5 0 0	2 0 0
600	2½	Do.,	1 10 0		
230	10	Chesham	10 0 0	5 0 0	10 10 0
30000	Sk.	*Chester United*	Stock.	10 0 0	182 0 0
24650	,,	Do., preference	,,	7 0 0	142 to 144
535	10	Do., new shares	10 0 0	7 0 0	14 0 0
250	5	Chester-le-Street	5 0 0	6 0 0	5 0 0
19200	Sk.	*Chesterfield Gas & Water*	100 0 0	5 0 0	178 0 0
400	50	Do., new shares	50 0 0	5 0 0	52 0 0
		Chesterton (L.)			
240	25	Chichester	25 0 0	6 0 0	31 10 0
		Chippenham			
329	10	Chipping Norton (Limited)	10 0 0	5 0 0	
100	10	Chipping Ongar	10 0 0	2 10 0	5 0 0
838	20	Chorley	20 0 0	7 0 0	27 0 0
		Chowbent, Lanc.			
		Christchurch			
200	5	ChurchStretton (L)	5 0 0		5 0 0
680	10	Cirencester	10 0 0	5 0 0 & Bns.	11 0 0
		Clay Cross			
		Clayton, Allerton, and Thornton			
257	10	Cleckheaton, A shares	10 0 0	7 10 0	
257	10	Do., B shares	10 0 0	7 10 0	
257	10	Do., new shares	10 0 0	7 10 0	
550	10	Clevedon (L.)	10 0 0	7 0 0	11 10 0
		Clitheroe			
1132	5	Cockermouth	5 0 0	5 0 0	5 5 0
300	5	Coggeshall	5 0 0		4½ to 5
900	20	Colchester	20 0 0	7 0 0	22½ to 23
		Coleford, Gloucester			
		Coleshill (L.) £2000			
160	10	Collingham (Lim.)	10 0 0	5 0 0	10 0 0
		Collumpton			
328	5	Colnbrook, Middsx.	5 0 0	5 0 0	5 0 0
150	20	Colne, Lancashire	20 0 0		36 0 0
150	10	Do., ½ shares	10 0 0	} £10	18 0 0
150	5	Do., ¼ shares	5 0 0		9 0 0
150	5	Do., A shares	5 0 0		9 0 0
150	5	Do., B shares	5 0 0		9 0 0
150	5	Do., C shares	2 0 0		5 0 0
200	25	*Congleton*	25 0 0	5 0 0	31 0 0
320	5	Conway (Limited)	5 0 0		5 0 0
		Corsham			
1600	25	*Coventry*	25 0 0	8 0 0	35 0 0
	25	Do., new shares	25 0 0	7 10 0	
200	10	Cowbridge	10 0 0	3 0 0	5 0 0
500	10	Cowes	10 0 0	5 0 0	
		Cradley Heath			
190	10	Cranbrook. £1900	10 0 0	7 10 0	
		Crawley		4 10 0	
		Crayford & Bexley			
		Crays			
420		Crediton	5 0 0	5 0 0	6 0 0
225	10	Crewkerne	10 0 0	6 0 0	10 0 0
		Cricklade (L.) £1000			
200	10	Croft & Hurworth	9 0 0		
1200	1	Crook (Limited)	1 0 0	10 0 0	1 5 0
		Croston (Limited)			
251	5	Crowland	5 0 0	7 0 0	
181	10	Crowle, Lincoln	10 0 0	10 0 0	
8000	5	*Croydon Commrcl.*	5 0 0	7 10 0	7 0 0
		Cuckfield			
250	20	Dartford	20 0 0	7 0 0	27 0 0
700	5	Dartmouth (Lim.)	5 0 0	7 0 0	6 0 0
125	20	Daventry	20 0 0	5 0 0	24 8 0
165	10	Dawley	10 0 0	5 0 0	10 0 0
346	5	Dawlish	5 0 0	8 0 0	7 10 0
1400	10	*Deal & Walmer*	10 0 0	7 0 0	10 0 0
1400	1¼	Do.	1 5 0	4 0 0	4 0 0
350	10	Do.	5 0 0	7 0 0	7 0 0
1200	1	Deddington	1 0 0		
		Dedham (L.) £1000			
		Delph, Yorkshire			
500	6	Denbigh	6 0 0	5 0 0	6 0 0
1700	25	*Derby*	25 0 0	10 0 0	50 2 6
		Dereham			
7000	5	*Devonport*	5 0 0	9 0 0	9 0 0
3000	5	Do., preference	4 0 0	5 0 0	4 0 0
7400	5	*Dewsbury & Batley*	5 0 0	10 0 0	10 0 0
3700	5	Do., new shares	5 0 0	7 10 0	7 10 0
		Diss			
		Dolgelly			
160	10	Donnington	10 0 0	5 0 0	10 0 0
340	27½	Dorchester	25 0 0	5 0 0	27 10 0
120	25	Dorking	24 0 0	5 0 0	25 0 0
		Donnington, Linc.			
192	25	Douglas, I. of Man	25 0 0	8 0 0	30 0 0
21945	Sk.	*Dover*	100 0 0	6 0 0	100 0 0
1855	10	Do., new shares	10 0 0	6 0 0	10 0 0
500	10	Dowlais (Limited)	10 0 0	8 0 0	12 0 0
25	60	Downham Market	60 0 0	7 10 0	
		Driffield			
3000	5	*Drighlington and Gildersome*	5 0 0	7 10 0	7 10 0
		Droitwich			
1000	20	*Droylsden*	9 0 0	8 5 0	
600	30	*Dudley*	30 0 0	6 6 0	38 to 40
1500	20	*Dukinfield*	14 0 0	10 0 0	33 10 0
200	10	Dunmow	10 0 0	5 0 0	10 0 0
		Dunstable			
900	10	Durham	10 0 0	10 0 0	£26
900	10	Do., new shares	5 10 0	10 0 0	
250	10	Dursley, Gloucstr.	9 0 0	8 0 0	9 5 0
150	5	Easingwold	5 0 0	5 0 0	
400	10	Eastbourne	10 0 0	5 0 0	11 0 0
90	20	East Dereham	20 0 0	5 0 0	21 0 0
356	5	East Grinstead	5 0 0	6 0 0	5 0 0
		Easton (Limited)		5 0 0	
1200	5	East Retford	5 0 0	10 0 0	7 10 0
		Eckington & Mosboro' (Limited)			
		Edgware			
		Egremont, Cumb.			
703	6½	*Elland*	6 10 0	8 0 0	10 0 0
800	5	Elsecar (Limited)	5 0 0	5 0 0	5 12 0
		Eltham			
200	10	Emsworth			
400	5	Enfield	5 0 0	5 0 0	5 0 0
		Epping (Limited)			
300	19	Epsom & Ewell	19 0 0		
		Erith			
325	10	Eton—Cannel Gas (Limited.)	10 0 0	5 0 0	10 0 0
700	10	Evesham (Lim.)	10 0 0	6 0 0	9½ to 10
1600	25	*Exeter*	25 0 0	8 0 0	40 to 42
250	10	*Exmouth*	10 0 0	5 0 0	10 0 0
58	25	Eye	25 0 0	5 0 0	25 0 0
170	10	Fairford	10 0 0	3 0 0	

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
		Fakenham (L.) £3500			
		Falkingham			
100	38	*Fareham*	38 0 0	5 0 0	
223	25	Farnham	25 0 0	7 0 0	35 0 0
		Farnworth and Kearsley			
		Farringdon			
140	50	Faversham	50 0 0	10 0 0	66 0 0
		Fazeley (L.) £3000			
120	10	Fenny Stratfd. (L.)	10 0 0	5 0 0	11 0 0
	5	Filey	5 0 0	5 0 0	5 0 0
1200	10	*Folkestone*	10 0 0	10 0 0	15 0 0
280	5	Framlingham	5 0 0	5 0 0	5 10 0
1155	1	Frodsham (Lim.)	1 0 0	5 0 0	1 0 0
320	25	Frome	25 0 0	10 0 0	
		Furness G. and W.			
12000	Sk.	*Gainsborough*	All	6 13 4	120 to 121
400	20	Do., new shares	7 10 0	6 13 4	8½ to 9
170	10	Gillingham (Lim.) Dorset	10 0 0	3 0 0	
103	25	Glastonbury	25 0 0	4 0 0	15 0 0
600	10	*Glossop*	10 0 0	9 0 0	16 0 0
600	5	Do.	5 0 0	9 0 0	8 0 0
1800	10	Do., new shares	6 10 0	7 10 0	8 10 0
1000	25	*Gloucester*, A shares	25 0 0	10 0 0	42 0 0
856	25	Do., B shares	18 15 0	7 10 0	25 0 0
260	20	Godalming	20 0 0	5 0 0	20 0 0
300	5	Do., new shares	5 0 0	5 0 0	5 0 0
100	20	Do., do.	8 0 0		
100	5	Do., do.	2 0 0		
621	5	*Gomersal*	5 0 0	6 0 0	6 7 6
		Gorleston & Sthdn.			
855	25	*Gosport*	25 0 0	10 0 0	42 0 0
450	20	Grantham	20 0 0	7 0 0	28 0 0
1000	20	*Gravesend*	20 0 0	5 0 0	21 0 0
		Grays Thurrock			
643	5	Gt. Berkhampstd.	5 0 0	6 0 0	5 10 0
1000	10	*Great Grimsby*	10 0 0	10 0 0	17 0 0
1000	6½	Do., new shares	4 10 0	10 0 0	8 2 6
700	5	Great Harwood	5 0 0	4 5 0	
280	5	Do., new shares	1 0 0		
210	10	Great Marlow	10 0 0	5 0 0	10 0 0
		Great Stanmore			
		Great Torrington			
450	5	Great Wigston	5 0 0	6 0 0	
150	1	Do., new shares	1 0 0	6 0 0	
1300	10	Guernsey	9 0 0	10 0 0	17 0 0
332	25	*Guildford*, A sh.	25 0 0		
352	3	Do., B shares	3 0 0		
		Do., new shares			
25	100	Guisborough	60 0 0	10 0 0	
		Hadleigh Cons. (L)			
240	5	Hadlow (Limited)	5 0 0		
140	10	Hailsham	10 0 0	6 0 0	10 0 0
40	50	Halesowen	50 0 0	6 0 0	
300	5	Halesworth	5 0 0	7 10 0	6 5 0
240	5	Haltwhistle (Lim.) Hampton	5 0 0	4 10 0	5 0 0
1000	10	*Harrogate*	10 0 0	7 10 0	15 0 0
1000	3½	Do., new shares	3 6 8	7 10 0	5 0 0
900	10	Do., do.	8 0 0	7 10 0	9 10 0
6800	5	*Hartlepool G. & W.*	5 0 0	7 0 0	6 17 6
3322	5	Do., new shares	5 0 0	7 0 0	6 17 6
9878	5	Do., do.	1 10 0	7 0 0	
1000	1	Hartley Wintney, Harwich	1 0 0	2 10 0	21s. to 23s.
662	6	*Haslingden*	6 0 0	10 0 0	10 0 0
343	6	Do., A shares	4 0 0	10 0 0	6 0 0
1650	25	*Hastings and St. Leonards*	25 0 0	8 0 0	
1500	20	Do.	12 0 0	7 0 0	
180	10	Hatfield			
		Harlow and Sawbridgeworth			
500	5	Havant	5 0 0	3 0 0	5 0 0
120	10	Haverhill	10 0 0	5 0 0	10 0 0
840	5	Hawick	5 0 0	10 0 0	10 0 0
244	5	Haworth	5 0 0		5 5 0
		Hay (L.), Brecon			
		Haydon Bridge			
7500	1	Hebden Bridge	1 0 0	10 0 0	1 10 0
170	10	Heckington (Lim.)	10 0 0		10 0 0
		Heckmondwike			
120	10	Hedon (Limited)	10 0 0	3 0 0	
145	12	Helston	12 0 0	9 0 0	
250	10	Hemel Hempstead	10 0 0	4 0 0	7 0 0
300	10	Henley (Limited)	10 0 0	6 0 0	10 0 0
		Hereford. £10,000		4 10 0	
300	10	Herne Bay	10 0 0	6 0 0	11 0 0
1300	10	*Hertford*	8 0 0	7 10 0	12 0 0
		Hessle (L.) £1500			
470	10	Hexham	10 0 0	8 0 0	14 0 0
400	25	*Heywood*	25 0 0	7 10 0	40 0 0
400	25	Do., new shares	25 0 0	7 10 0	37 10 0
400	25	Do., C shares	10 0 0	7 10 0	16 0 0
160	10	Higham Ferrers	10 0 0	7 0 0	12 0 0
		Highworth, Wilts.			
520	5	High Wycombe	5 0 0	6 0 0	6 16 0
300	10	Hinckley	10 0 0	7 10 0	10 0 0
600	5	Hindley, Lancash.	3 0 0		3 0 0
200	20	Hitchin	20 0 0	8 0 0	
200	5	Do., new shares	5 0 0	8 0 0	
880	5	Hoddesden	5 0 0	7 0 0	6 0 0
555	20	*Holmfirth*	19 0 0	5 0 0	19 0 0
960	5	Holyhead	5 0 0	6 0 0	6 2 6
		Holywell (*see* Brit. Provincial)			
98	25	Honiton	25 0 0	3 12 0	20 0 0
1250	1	Honley (Limited)	1 0 0	5 0 0	1 0 0
6	500	Horncastle	£500		
		Hornsey (Lim.)			
1200	2½	Horsforth	2 10 0		2 10 0
193	20	Horsham	20 0 0	10 0 0	26 0 0
	10	Houghton-le-Sprg.	10 0 0	8 0 0	
		Howden			
1700	20	*Huddersfield*	20 0 0	10 0 0	37 5 0
250	20	Do., new shares	15 0 0	10 0 0	
		Hull			
		Hull-Sculcoates (*see* Brit. Prov.)			

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
216	10	Hungerford	10 0 0	5 0 0	10 0 0
1200	10	*Huntingdon*	10 0 0	8 0 0	16 5 0
		Hurstperpoint			
600	10	Huyton & Roby	10 0 0	7 0 0	12 2 6
2500	10	*Hyde*	9 0 0	5 10 0	10 15 0
400	10	Hythe & Sandgate	10 0 0	6 0 0	10 15 0
		Idle & Eccleshill (*see* Airdale)			
		Ilford			
198	12	Ilfracombe	2 0 0	4 0 0	8 to 9
560	6½	Ilkestone	6 5 0	11 4 0	8 0 0
		Ilkley			
		Ilminster			
250	5	Ingatestone (Lim.)	5 0 0	1 10 0	
2800	10	*Ipswich*	10 0 0	10 0 0	18 0 0
1400	10	Do.	7 10 0	7 10 0	
		Ironbridge			
180	10	Irthlingborough	10 0 0	7 0 0	10 0 0
800	30	*Isle of Thanet* (Margate & Ramsgate.)	30 0 0	10 0 0	60 0 0
		Jersey, St. Helier's			
363	5	Kelvedon (Lim.)	5 0 0		
1842	10	*Kendal United Gas and Water*	9 0 0	10 0 0	17 0 0
380	20	Do., preference	20 0 0	7 10 0	32 0 0
290	10	Kenilworth (Lim.)	10 0 0	4 0 0	10 0 0
400	5	Keswick	5 0 0	5 0 0	4 0 0
228	25	Kettering	25 0 0	6 10 0	30 0 0
		Ketton (L.) Rutld.		7 0 0	
		Keynsham			
500	5	Kibworth	5 0 0	6 0 0	7 0 0
		Kiddrmstr, £10,000		5 0 0	
800	5	Kidsgrove	5 0 0	12 0 0	7 10 0
150	10	Kimbolton	10 0 0	7 0 0	12 0 0
140	7	Kingsbridge	7 0 0		10 to 11
270	5	King's Cliffe	5 0 0	5 10 0	5 0 0
		Kingstn-on-Tham.			
		Kingswinford District (Limited)			
		Kington, Hereford			
400	5	Kinver, Staffordsh.	5 0 0		5 0 0
		Kirby Lonsdale			
		Kirkburton			
400	5	Kirkby Stephen (L)	5 0 0		
330	5	Kirkham, Lanc.	5 0 0	4 0 0	5 0 0
330	2½	Do., new shares	2 10 0	4 0 0	2 10 0
200	10	Kirton-in-Lindsey	10 0 0	5 0 0	10 10 0
200	5	Knighton (L.)	5 0 0		
1000	10	*Knottingley*			
670	5	Knutsford Gas and Water (Limited)	5 0 0	8 0 0	5 10 0
319	5	Do.,	3 0 0	8 0 0	3 10 0
470	31¼	*Lancaster*	31 10 0	7 2 10	48 0 0
470	6gs.	Do.	6 6 0	7 2 10	9 12 0
564	15⅞	Do.	15 15 0	7 2 10	24 0 0
50	25	Langport	25 0 0	4 0 0	15 0 0
		Launceston			
		Lea Bridge (*see* County & Gen)			
1500	20	*Leamington Priors*	20 0 0	10 0 0	30 0 0
250	20	Do., new shares	20 0 0	5 0 0	20 0 0
213	10	Leatherhead	10 0 0	5 0 0	10 0 0
		Ledbury			
		Leeds Company—			
190200	Sk.	Consolidated stk.	£100	6 0 0	113 to 114
6790	5	Do., new	1 0 0	6 0 0	1 12 6
		Leeds New Comp—			
450001		Old stock	£100	10 0 0	178 to 180
117500		New do.	£100	6 0 0	106 to 108
6500	5	Do., B shares	2 0 0	6 0 0	2 5 0
		Leeswood (Lim.)			
3900	13	*Leicester*	13 0 0	10 0 0	23 0 0
5000	10	Do., new shares	10 0 0	7 10 0	15 0 0
		Leigh		7 0 0	
476½	21	Leighton Buzzard	21 0 0	8 0 0	30 0 0
500	10	Leominster	10 0 0	5 0 0	9 10 0
330	25	Lewes, A shares	25 0 0	8 0 0	31 5 0
644	5	Do., B shares	5 0 0		6 5 0
245	5	Leyburn, Yorksh.	5 0 0		6 0 0
		Leyland, Lancash.			
250	20	Lichfield	20 0 0	10 0 0	40 0 0
320	25	*Lincoln*	25 0 0	10 0 0	70 0 0
800	5	Lindfield (Limited)	5 0 0	8 0 0	5 0 0
240	5	Liskeard	5 0 0	7 10 0	6 0 0
		Littleborough			
240	5	Littlehampton	5 0 0	10 0 0	5 0 0
	Sk.	*Liverpool United*	£100	10 0 0	197 0 0
	25	Do., ¼ share	25 0 0		52¼ to 52½
259	5	Llandovery (Lim.)	1 10 0	7 0 0	
1219	10	Llandudno Gas and Water	10 0 0	7 0 0	12 10 0
		Llanelly £3000			
		Llanfyllin (L.) £2000			
		Llangollen			
250	10	Llanrwst (Limited)	9 15 0	5 0 0	9 15 0
262	5	Loddon	5 0 0	5 0 0	5 0 0
		Long Buckby (L.)			
120	10	Long Sutton (Lim.)	10 0 0	7 10 0	11 to 12
2000	10	*Longton*	6 0 0	10 0 0	9 0 0
		Longwood, near Huddersfield			
230	5	Lostwithiel	5 0 0	4 0 0	6 0 0
250	1	Do., new shares	1 0 0	5 0 0	1 10 0
1422	6	Loughborough	6 0 0	10 0 0	11 15 0
240	25	*Louth*	25 0 0	10 0 0	35 0 0
2500	10	*Lowestoft Gas & Water*			
611	5	Ludlow Union	5 0 0	5 0 0	5 0 0
250	5	Do., pref. shares	5 0 0	5 0 0	
640	10	*Luton*	10 0 0	7 10 0 & Bns.	12 0 0
640	5	Do., preferential	5 0 0	4 0 0	5 0 0
640	5	Do., new shares	5 0 0	7 10 0 & Bns.	6 0 0
100	20	Lutterworth	20 0 0	6 5 0	25 0 0
		Lydney (L.) £3000			
63	20	Lyme Regis	20 0 0	4 0 0	20 0 0
120	25	Lymington	25 0 0	5 0 0	25 0 0
400	10	Lymm	9 0 0	6 0 0	10 0 0
300	10	Maidenhead	10 0 0	5 0 0	10 0 0

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
500	25	*Maidstone*, A sh.	25 0 0	10 0 0	45 0 0
500	25	Do., B shares	25 0 0	4 0 0	20 0 0
	25	Do., new shares	25 0 0	7 10 0	
204	23	Maldon	23 0 0	7 0 0	27 0 0
200	10	Malmesbury	10 0 0	2 10 0	5 15 0
		Malpas (Limited)			
		Malvern Link			
		Manningtree			
		Mansfield £5000		10 0 0	
150	10	Mansfield Woodhse	10 0 0		
		March			
		Margate (*see* I. of Thanet)			
		Market Drayton			
132	25	Market Harboro'	25 0 0	7 0 0	35 0 0
		Market Weighton			
		Markyate St. (L.)			
		Marlborough			
150	10	Marsden (Lim.)	10 0 0	5 0 0	10 0 0
671	20	Maryport	14 0 0		14 5 0
600	5	Matlock (Lim)	5 0 0	6 0 0	
508	5	Matlock Bridge, Matlock Bank, & Matlk. Town (L.)	5 0 0	6 0 0	
200	2	Measham (Lim.)	1 12 6	5 0 0	
220	10	Melbourne	10 0 0	6 0 0	12 0 0
		Melksham			
934	2	Meltham	2 0 0	4 10 0	
		Melton Mowbray			
50	10	Mere	10 0 0		
		Merthyr Tydvil			
120	10	Middleham	10 0 0	5 0 0	10 0 0
3000	10	*Middleton*		10 0 0	
		Middleton-in-Teesdale			
400	5	Midhurst (Lim.)	5 0 0	2 10 0	5 0 0
		Midsmmr. Norton			
198	5	Mildenhall	5 0 0	5 0 0	
300	5	Milnthrpe (L.) £1500	4 10 0	3 6 8	
184	10	Milverton (Lim.)	10 0 0	5 0 0	10 0 0
2000	5	*Mirfield*	5 0 0	5 0 0	6 5 0
700	10	Mitcham	10 0 0	10 0 0	14 10 0
650	5	Mold Gas & Water	5 0 0	7 10 0	6¼ to 6¾
700	10	Monmouth Gas & Water	10 0 0	5 0 0	10 0 0
250	5	Montgomery (L.)	5 0 0		
150	10	Moreton-in-Marsh	9 2 6	4 0 0	9 2 6
1000	5	*Morley*, nr. Leeds	5 0 0	10 0 0	8 10 0
1000	2	Do.	2 0 0	10 0 0	3 8 0
220	16	Morpeth	16 0 0	5 0 0	17 10 0
		Mossley			
		Mottram			
		Nayland			
		Neath			
185	10	Needham Market	10 0 0	4 0 0	
1000	5	Nelson (Limited)			
		Nethrthng (L.) £700			
		Newark £5000		10 0 0	
		Newburn			
250	20	Newbury	20 0 0	5 0 0	20 0 0
		Newcstle & Gatshd.			
		Nwcstle-un.-Lyne			
250	5	Newent	5 0 0		
		Newhaven, Sussex			
		New Malton			
600	5	Newmarket	5 0 0	4 0 0	4 0 0
366	2	Do., preference	2 0 0	6 0 0	2 0 0
		New Mill (L.) £7000			
200	20	*New Mills & Hayfield*	15 10 0	5 0 0	
		Newnham (Lim.)	20 0 0		21 0 0
70	20	Newport Pagnell			
360	35	*Newport, Mon.*, A shares	35 0 0	9 0 0	50 0 0
540	35	Do., B shares	35 0 0	7 10 0	42 10 0
		Newport, Salop			
250	5	New Romney (Ld.)	5 0 0	5 0 0	5 0 0
		Newton Abbott			
198	10	Newtown, Mont.	10 0 0	6 0 0	10 0 0
		Northallerton			
777	20	*Northampton*, A shares	20 0 0	10 0 0	38 0 0
777	20	Do., B shares	20 0 0	4 0 0	14 0 0
777	20	Do., C shares	20 0 0	7 10 0	29 0 0
2331	5⅞	Do.	2 13 4	7 10 0	
		North Bierley			
		Northfleet (*see* Co. & General)			
		Northleach			
2914	5	North Shields	5 0 0	5 0 0	6¾ to 7¼
120	10½	North Walsham	10 10 0	5 0 0	10 15 0
371	15	Northwich	15 0 0	5 0 0	15 0 0
		Norwich (*see* Brit. Provincial)			
4600	50	*Nottingham*	50 0 0	5 10 0	60 0 0
	50	Do., new shares	50 0 0	5 10 0	63 0 0
268	8	Nuneaton (Lim.)	8 0 0	5 0 0	7 10 0
125	8	Do., new shares	8 0 0	5 0 0	7 10 0
		Oaken Gates, Salop			
240	5	Oakhampton (Lim.)	5 0 0		
200	10	Odiham	10 0 0	6 0 0	10 10 0
320	5	Old Goole (Lim.)	5 0 0	6 0 0	5 0 0
		Olney			
360	10	*Ormskirk*, old sh.	10 0 0	8 0 0	14 0 0
1080	10	Do., new shares	4 10 0	8 0 0	6 4 6
2400	5	*Ossett & Horbury*	5 0 0	8 0 0	9 0 0
		Oswestry			
		Otley, Yorkshire			
80	25	Oundle	25 0 0	7 0 0	25 0 0
600	15	*Over Darwen*, Original	15 0 0	5 0 0	19 0 0
600	15	Do., A shares	15 0 0	5 0 0	19 0 0
1200	15	Do., B shares	7 10 0	5 0 0	10 0 0
1694	1	Over & Whrtn. (L)	1 0 0		1 2 0
320	5	Owston Ferry (L.)	5 0 0	5 0 0	5 0 0
120	150	*Oxford*	£150	9 0 0	290 to 300
1527	5	Padiham	5 0 0	6 0 0	6 0 0
338	2½	Painswick	2 10 0		2 10 0
		Pangbourne (L.)			
		Pately Br., Yorksh.			
300	5	Peel, Isle of Man	5 0 0	7 0 0	6 to 7

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
		Pembroke (*see* Co. and General)			
500	20	*Peniston*			
250	20	Penrith	15 0 0	6 10 0	21 0 0
153	20	Penzance	20 0 0		15 0 0
		Pershore			
320	5	Petersfield	5 0 0	5 0 0	
300	10	Petworth	10 0 0	9 17 6	16 0 0
1250	2	Pewsey (Limited)	2 0 0	6 0 0	2 0 0
		Pickering			
2500	10	*Plymouth & Stonehouse*	10 0 0	10 0 0	19 0 0
2500	10	Do., new shares	10 0 0	7 10 0	14 0 0
250	10	Do., new shares	3 0 0	7 10 0	4 10 0
160	10	Pocklington	10 0 0		5 0 0
		Ponder's End & Enfield Highway (Limited)			
		Pontefract			
		Pontypridd		4 0 0	
400	10	Poole	10 0 0	10 0 0	15 0 0
344	2	Do., new shares	2 0 0	10 0 0	3 0 0
643	5	Port Madoc (Lim.)	5 0 0	5 0 0	
		Port Talbot			
600	53	*Portsea Island*	53 0 0	8 0 0	60 0 0
600	50	Do., new shares	50 0 0	8 0 0	57 0 0
600	50	Do., new shares	49 0 0	8 0 0	56 0 0
9000	Sk.	Do.		5 0 0	92 0 0
120	10	Potton, Bedfordsh.	10 0 0	5 0 0	10 0 0
400	10	Prescott	10 0 0	5 0 0	
		Presteign			
120000	Sk.	*Preston*	All.	10 0 0	210 to 215
1000	10	Provincial (Hull)	8 0 0		8 0 0
600	20	*Pudsey*	20 0 0	7 10 0	30 0 0
600	6¾	Do., new shares	4 13 4	7 10 0	4 13 4
93	20	Pwlheli	20 0 0	2 10 0	25 0 0
600	5	Quorndon & Mountsorrel	5 0 0	7 0 0	12 0 0
900	10	*Radcliff & Pilkington*, No. 1	10 0 0		
2100	10	Do., No. 2	6 0 0		
200	20	Ramsay, I. of Man	20 0 0	6 10 0	23 0 0
		Ramsey, Hunts			
		Ramsgate (*see* I. of Thanet)			
		Rastrick			
		Rawmarsh			
20000	Sk.	*Reading*	100 0 0	8 0 0	120 5 0
5000	,,	Do.	100 0 0	5 0 0	100 10 0
1000	10	Do.	10 0 0	7 0 0	11 0 0
500	10	Do., preference	10 0 0	5 0 0	10 10 0
		Redbourn (L) £1100			
400	5	Redcar	5 0 0	4 0 0	5 0 0
1200	5	*Redhill*	5 0 0	6 0 0	5 5 0
		Redruth			
		Reigate			
1200	1	Repton (Limited)	1 0 0	5 0 0	1 1 0
2000	10	Richmond, Sry. (L)	10 0 0	7 0 0	15 0 0
600	5	Rhosllanerchrugog	3 0 0	7 10 0	5 0 0
		Rhymney (Lim.)			
400	5	Rickmansworth	5 0 0		5 0 0
180	10	Ringwood	10 0 0	5 0 0	10 0 0
180	33⅓	Ripon	33 10 0	4 10 0	
		Robin Hood's Bay (Limited)			
		Rochester & Chatham		6 0 0	
		Rochford			
2600	5	Romford	5 0 0	6 0 0	5 5 0
220	10	Romsey	10 0 0	7 10 0	12 10 0
7500	Sk.	*Rotherham*, A stock	100 0 0	10 0 0	186 to 190
2500	Sk.	Do., B stock	100 0 0	8 0 0	152 to 154
600	20¼	Do., new shares	10 0 0	8 0 0	14¼ to 15
		Rothwell			
350	10	Royston	10 0 0	5 0 0	9 10 0
150	20	Rugby	20 0 0	10 0 0	
150	5	Do., ¼ shares	5 0 0	10 0 0	
150	6¾	Do., ¼ shares	6 13 4	10 0 0	
150	10	Do., new shares	10 0 0	10 0 0	
150	2½	Do., do.	2 10 0	10 0 0	
150	3¾	Do., do.	3 6 8	10 0 0	
430	10	Rugely	10 0 0	5 0 0	10 10 0
2400	5	*Runcorn*	5 0 0	7 10 0	
2400	5	Do., new shares	3 5 0	7 10 0	
114	31¼	Ruthin	31 5 0	6 16 0	40 0 0
1500	12½	Ryde	12 10 0	8 0 0	
500	5	Rye	5 0 0	6 0 0	6 0 0
		Saddleworth			
225	22	Saffron Walden	22 0 0	4 0 0	16 to 18
1400	5	St. Alban's Gas & Water (Lim.)	5 0 0	5 0 0	5 5 0
320	5	St. Asaph (Lim.)	5 0 0		
		St. Austell			
		St. Bees (Lim.)			
		St. Colomb			
3000	10	*St. Helen's*	10 0 0	10 0 0	18 10 0
		St. Ives, Cornwall			
		St. Mary's Cray			
880	12½	*Salisbury*	12 10 0	10 0 0	17 10 0
160	12½	Do., preference	12 10 0	6 0 0	15 0 0
341	10	Sandbach	10 0 0	5 0 0	12 10 0
		Sandown (Lim.)			
381	10	Sandwich	10 0 0	5 0 0	
		Sandy, Beds			
100	10	Saxmundham	10 0 0	5 0 0	
2000	10	*Scarborough*	10 0 0	7 0 0	13 0 0
1000	10	Do.	6 0 0	7 0 0	12 2 6
240	5	Sedburgh	5 0 0		
300	16	Selby	16 0 0	7 10 0	
140	5	Settle (Limited)	3 10 0	5 0 0	
290	10	Sevenoaks	10 0 0	4 0 0	10 0 0
300	10	Shaftesbury (Lim.)	10 0 0	5 0 0	8¼ to 9
565	5	Sheepshed (Lim.)	5 0 0	6 0 0	6 0 0
135000	Sk.	*Sheffield United*, A stock	100 0 0	10 0 0	194 to 196
129984	Sk.	Do., B stock	100 0 0	10 0 0	193 to 195
2635	30	Do., C shares	15 0 0	10 0 0	40¼ to 40¾
600	5	Shefford (Limited)	4 0 0		
		Shelton, Potteries (*see* Brit. Prov.)			

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
2900	5	Sheppy, Sheerness	5 0 0	10 0 0	7 0 0
600	5	Do., pref. sh.	5 0 0	4 0 0	
350	10	Shepton Mallet	10 0 0	7 10 0	10 0 0
1000	5	Sherborne	5 0 0	7 10 0	5 0 0
		Shiffnal, Salop			
1000	5	*Shipley*	5 0 0	6 0 0	7 10 0
150	10	Shipston-on-Stour	10 0 0	4 0 0	
		Shirley & Freemantle, Hants			
240	25	Shotley Br. (Lim.)	25 0 0	7 0 0	26½ to 27
240	10	Do., new shares	10 0 0	7 0 0	
1000	10	*Shrewsbury*, A shares	10 0 0	10 0 0	20 0 0
1000	10	Do., B shares	10 0 0	5 0 0	10 0 0
1000	10	Do., new shares	10 0 0	7 10 0	15 0 0
		Sible Hedingham			
7000	Sk.	*Skipton*	100 0 0	9 0 0	150 0 0
400	2½	Do., new shares	2 10 0	5 0 0	3 0 0
		Slaithwaite			
250	20	Sleaford	20 0 0	5 0 0	20 0 0
250	10	Slough	10 0 0		
340	5	Snaith	5 0 0		4 0 0
		Soham			
150	10	Somerton	10 0 0		
354	5	Southam	5 0 0		
1000	50	*Southampton*	50 0 0	10 0 0	
		Southborough			
		Southend, Essex			
220	10	South Molton	10 0 0	5 10 0	7 10 0
		South Petherton (L)			
2000	10	*South Shields*	10 0 0	9 0 0	15 to 17
248	10	Southwell (Lim.)	10 0 0	5 0 0	11 to 11½
300	5	Southwold	5 0 0	5 0 0	5 0 0
1470	1	Spennymoor (Lim.)	1 0 0		
400	5	Spilsby	5 0 0		
		Spittal, Berwick-on-Tweed			
2000	6¾	*Stafford*	6 13 4	10 0 0	10 0 0
2000	6¾	Do., new shares	4 0 0	8 0 0	5 0 0
178	5	Staindrop	5 0 0	6 0 0	5 0 0
248	25	Staines & Egham	25 0 0	6 0 0	26 to 27
		Staley Bridge		10 0 0	
225	50	*Stamford & St. Martin's*	50 0 0	9 0 0	75 0 0
150	10	Staveley (Limited)	10 0 0	5 0 0	11 10 0
300	5	Stevenage	5 0 0	5 0 0	5 0 0
2500	10	*Stoke, Fenton & Longton*	10 0 0	10 0 0	
500	10	Do.,	2 0 0	10 0 0	
400	5	Stone, Stafford	5 0 0	5 0 0	6 0 0
220	10	Stoney Stratford	10 0 0	4 10 0	9 0 0
		Storrngtn (L) £1000			
		Stourbridge, £5000			
1100	1	Stow-on-the-Wold	1 0 0	5 0 0	1 0 0
150	20	*Stratford-on-Avon*	20 0 0	10 0 0	40 0 0
150	5	Do., new shares	5 0 0	10 0 0	10 0 0
375	8	Do., preference	8 0 0	5 10 0	8 10 0
750	5	*Stretford*	5 0 0	9 0 0	5 0 0
		Stroud			
261	20	Sudbury	20 0 0	5 0 0	20 0 0
		Sunbury (L), Mid.			
18120	5	*Sunderland*	5 0 0	8 10 0	8 to 8½
4000	5	Do., new shares	5 0 0	8 10 0	8 0 0
200	10	Sutton Coldfield (L)	10 0 0		10 0 0
350	10	Sutton-in-Ashfield	10 0 0	7 10 0	12 10 0
		Sutton Southcoates & Drypool, Hull	20 0 0		23 to 24
		Sutton, Surrey			
600	5	Swadlincote	5 0 0	5 0 0	6 0 0
169	10	Swaffham	10 0 0	5 0 0	7 0 0
240	25	*Swansea*	25 0 0	10 0 0	45 to 47
1280	25	Do., new shares	25 0 0	7 10 0	35 0 0
		Swindon			
		Swindon New (L)			
200	10	Swineshead (Lim.)	10 0 0	5 0 0	10 5 0
1000	5	Swinton & Mexboro'	5 0 0	7 0 0	7 0 0
180	10	Syston	10 0 0		10 0 0
276	5	Tadcaster	5 0 0	5 0 0	3 0 0
		Tamworth			
		Taporley (Lim.)			
		Tattershall & Coningsby (Lim.)			
2800	5	*Taunton*	5 0 0	6 0 0	6 0 0
2800	1½	Do., new shares	1 10 0	6 0 0	
800	6¾	Tavistock	3 3 9	6 0 0	5 10 0
200	5	Tenbury Union	5 0 0	5 0 0	5½ to 6
150	10	Tenterden	10 0 0	4 0 0	8 0 0
200	10	Tetbury, Gloster	9 0 0	5 0 0	
		Tewkesbury			
200	10	Thame	10 0 0	5 0 0	10 0 0
250	10	Thetford	10 0 0	6 0 0	10 to 11
150	10	Thornbury (Lim.)	10 0 0	4 0 0	
80	1	Do., new shares	1 0 0	4 0 0	
356	5	Thorne	5 0 0		4 0 0
160	10	Thrapston (Lim.)	10 0 0	5 0 0	10 0 0
		Tideswell (L.) £2000			
1885	5	Todmorden (Lim.)	5 0 0	7 10 0	7 10 0
1870	5	Do., B shares	3 0 0	7 10 0	4 10 0
600	2½	Topsham (Lim.)	2 10 0	5 0 0	
		Torpoint (Lim.)			
		Torquay			
		Torrington, Devon			
		Totnes			
		Totnes Consumers			
5000	5	*Tottenham & Edmonton*	5 0 0	8 0 0	6 0 0
150	10	Towcester	10 0 0	5 0 0	10 0 0
		Town-Malling			
300	5	Towyn (L) Merion	5 0 0		5 0 0
275	10	Tring	10 0 0	5 0 0	10 0 0
		Trowbridge (*see* Brit. Provincial)			
320	25	Truro	25 0 0	10 0 0	
		Tunbridge			
2000	10	*Tunbridge Wells*	10 0 0	10 0 0	19 0 0
100	10	Tuxford	10 0 0	5 0 0	12 0 0
		Twyford (Limited)			
		Ulverston			
		Uppingham			
240	5	Upton-on-Severn	5 0 0	5 0 0	5 0 0

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
	£		£ s d	£ s d	£ s d
309	5	Usk (Limited)	5 0 0	8 0 0	6 12 6
250	10	Uttoxeter	10 0 0	5 0 0	13 0 0
		Uxbridge			
		Ventnor			
160	10	Wainfleet (Lim.)	10 0 0		8 0 0
1000	25	*Wakefield*	25 0 0	10 0 0	44 0 0
3660	5	Do.,	5 0 0	10 0 0	8 16 0
1732	5	Do., new shares	5 0 0	7 10 0	6 15 0
400	5	Walker & St. Anthony (L)	5 0 0		7¾ to 8¼
300	10	Wallingford	10 0 0	5 0 0	8 0 0
		Walton-on-Tham. (*see* Co. & Gen.)			
200	10	Wantage	9 0 0	5 0 0	10 10 0
		Ware (*see* C. & G.)			
100	10	Wareham	10 0 0	3 10 0	8 0 0
2000	1	Warkwth & Amble	1 0 0	3 10 0	
200	25	Warminster	25 0 0	6 0 0	28 0 0
900	20	*Warrington*	20 0 0	10 0 0	38 0 0
900	20	Do., new shares	15 0 0	10 0 0	27 0 0
		Warth			
		Warwick. £15,000		6 0 0	
		Watford			
400	10	Weedon (Limited)	10 0 0	6 10 0	12 10 0
400	3	Do., new shares	1 10 0	6 10 0	1 17 6
111	25	Welchpool, Montg.	25 0 0	5 0 0	25 0 0
200	25	Wellingborough	25 0 0	5 0 0	25 0 0
450	10	Wellington, Salop	10 0 0	7 10 0	12 10 0
		Wellington, Som.			
160	25	*Wells*, Somerset	25 0 0	10 0 0	
		Wem (Lim.) £2000			
		W. Auckld. & St. Helen's, Auckld (L)			
160	10	Westbury	10 0 0		
		West Cowes			
225	10	Westerham (Lim.)	10 0 0	5 0 0	11 0 0
454	5	West Malling Gas and Water	5 0 0	3 0 0	4 10 0
200	20	*Weston-sup.-Mare*			
		A shares	20 0 0	10 0 0	30 0 0
200	20	Do., B shares	20 0 0	7 10 0	20 0 0
800	20	Do., C shares	6 0 0	7 10 0	7 13 0
200	5	Wetherby	5 0 0		1 10 0
2000	10	*Weymouth*			
		Whaley Bridge			
2300	1	Whitchurch, Hants	0 10 0	2 10 0	
400	25	Whitehaven	25 0 0	2 0 0	14½ to 15
		Whitehaven New			
		Whitstable			
		Whittington			
250	10	Whittlesea	10 0 0	5 0 0	11 0 0
300	10	Whitwick & Coalville	10 0 0		10 0 0
1200	5	*Whitworth Vale*	5 0 0	4 0 0	7 0 0
1200	5	Do., new shares	4 7 6	4 0 0	6 7 6
		Widnes Gas & Wtr.			
1250	10	*Wigan*	10 0 0	10 0 0	20 0 0
1250	10	Do., preference	10 0 0	5 0 0	10 0 0
2500	10	Do., new shares	5 0 0	7 10 0	8 15 0
400	5	Wigston	5 0 0	6 0 0	5 0 0
		Wigton, Cumberd.			
1020	5	*Willenhall*, A shares	5 0 0		
1020	54s.	Do., B shares	2 14 0	5 0 0	
		Do., new shares			
		Wilton			
600	10	Wimbledon	8 0 0		8 0 0
240	10	Wimborne Minster	10 0 0		
130	10	Wincanton	10 0 0	7 0 0	
		Winchcombe £1500			
		Winchester G. & W.			
		Windermere Dist.			
1200	20	Windsor (Limited)	20 0 0	7 10 0	24 0 0
141	10	Winslow	10 0 0	6 0 0	10 0 0
120	10	Winterton (Lim.)	10 0 0	5 0 0	
120	5	Do., new shares	5 0 0	5 0 0	
200	10	Wirksworth	10 0 0	5 0 0	10 0 0
		Wisbeach			
		Witham			
		Witney			
400	5	Wiveliscombe (L)	5 0 0	6 0 0	5 5 0
		Wivenhoe (L) £2000			
200	10	Woburn	10 0 0	5 0 0	11 0 0
210	10	Wokingham	10 0 0	5 0 0	
4448	10	*Wolverhampton*	10 0 0	10 0 0	18 10 0
4448	10	Do., new shares	7 0 0	10 0 0	14 5 0
550	10	Woodbridge (Lim.)	10 0 0	8 0 0	
660	2½	Woodstock	2 10 0	5 0 0	
		Woodhouses			
200	7	Wooler	7 0 0		
2400	5	*Woolwich Consrs.*	5 0 0	10 0 0	8 0 0
2400	5	Do., do.	5 0 0	7 10 0	7 0 0
4800	5	Do., do.	3 0 0	7 10 0	4 0 0
		Woolwh. Equitable			
		Wootton Bassett			
2400	10	*Worcester*	10 0 0	10 0 0	14 7 6
		Workington			
600	10	*Worksop*	10 0 0	5 0 0	
600	5	Do., new shares	5 0 0	5 0 0	
		Worthing			
		Worsboroughdale & Worsboro.			
270	12	Wotton-un.-Edge	12 0 0	4 0 0	7 0 0
600	5	Wrexham, A sh.	5 0 0	7 10 0	5 0 0
600	5	Do., B shares	5 0 0	5 0 0	5 0 0
600	5	Do., C shares	3 10 0	5 0 0	3 10 0
		Writtle			
		Wye, Kent			
		Wylam			
400	5	Wymondham	5 0 0	6 10 0	5 0 0
		Yarmouth, I. of W.			
800	30	*Yarmouth, Norfk.*	30 0 0	7 10 0	
800	7½	Do., ¼ shares	7 10 0	7 10 0	
1675	4	Yeadon & Guiseley	4 0 0	5 0 0	4 8 0
1675	2	Do., new shares	0 5 0	5 0 0	0 5 6
140	30	Yeovil	30 0 0	6 0 0	30 0 0
140	10	Do., new shares	10 0 0	6 0 0	10 0 0
		York Town			
15000	10	*York United*	5 0 0	10 0 0	10 10 0
		Yoxford			

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share	Div. per Cent. per Annum.	Price per Share.
	£	**SCOTLAND.**	£ s d	£ s d	£ s d
26000	2½	Aberdeen	2 10 0	10 0 0	5 1 0
		Abernethy			
		Aberlour(L.) £650			
500	10	Airdrie	10 0 0	9 0 0	14 10 0
		Alloa			
		Alva, nr. Stirling			
		Alyth			
600	5	Annan	5 0 0	5 0 0	5 0 0
1600	1	Anstruther & Cellardyke	1 0 0	8 0 0	1 6 0
825	20	Arbroath	20 0 0	7 10 0	30 0 0
100	20	Ardrossan	20 0 0	5 0 0	20 0 0
658	1	Auchinleck	1 0 0		
381	5	Auchterarder	5 0 0	7 10 0	7 10 0
750	2	Auchtermuchty	2 0 0	6 0 0	2 10 0
3932	5	Ayr	5 0 0	6 0 0	5 16 0
4250	2	Ayr&NewtonCons.	2 0 0	6 0 0	2 2 0
300	10	Banff	10 0 0	6 0 0	11 0 0
2158	1	Barrhead	1 0 0	7 10 0	1 0 0
200	5	Bathgate	5 0 0	5 0 0	5 0 0
		Beith			
976	1	Bervie	1 0 0	5 0 0	
		Biggar			
739	5	Blairgowrie	5 0 0	8 0 0	7 0 0
		Blantyre (Lim.)			
400	6	Borrowstowness	6 0 0	5 0 0	6 0 0
540	5	Brechin	5 0 0	10 0 0	11 0 0
		Bridge of Allan			
4175	2	Broughty Ferry	2 0 0	4 0 0	2 4 0
		Callender			
		Campbelton			
250	4	Carluke, Lanark	4 0 0	7 10 0	4 0 0
178	5	Castle Douglas	5 0 0	5 0 0	5 0 0
2530	3	Coatbridge	3 0 0	10 0 0	5 0 0
200	5	Coldstream	5 0 0	6 0 0	5 0 0
		Collinsburgh			
1000	1	Comrie	1 14 8	4 10 0	1 14 8
		Corstorphine			
1200	1	Crail, Fife	1 0 0	5 0 0	1 0 0
2744	1	Crieff	1 0 0	10 0 0	1 15 0
600	1	Cullen	1 0 0	5 0 0	0 15 0
280	2½	Cumbernauld	2 10 0	5 0 0	2 10 0
200	5	Cumnock	5 0 0	6 0 0	6 0 0
600	5	Cupar Angus	5 0 0	7 0 0	6 10 0
250	10	Cupar Fife	10 0 0	10 0 0	18 10 0
300	10	Dalkeith	10 0 0	10 0 0	20 0 0
		Deanston			
750	2	Denny	2 0 0	6 5 0	2 5 0
		Denny Consumers			
	5	Dornoch			
500	1	Douglas	1 0 0	6 0 0	1 2 0
		Dufftown			
		Dumbarton			
400	20	Dumfries	14 0 0	7 2 10	14 10 0
391	5	Dunbar	5 0 0	6 0 0	5 10 0
		Dunblane			
1250	23½	*Dundee*	23 15 0	8 15 9	54 0 0
3000	5	*Dundee, New*	5 0 0	5 0 0	5 15 0
860	10	Dunfermline	10 0 0	10 0 0	16 10 0
		Dunkeld			
1750	2	Dunoon	2 0 0	6 0 0	2 3 0
		Dunse			
250	5	Dysart	5 0 0	7 10 0	6 10 0
2327	1	East Wemyss	1 0 0	6 0 0	1 2 0
750	1	Ecclefechan	1 0 0		
6000	25	*Edinburgh*	25 0 0	10 0 0	49 0 0
6400	2 ½	*Edinburgh & Leith*	25 0 0	8 0 0	50 0 0
621	12	Elgin	12 0 0	6 0 0	13 0 0
1300	1	Elie & Earlsferry	1 0 0	7 5 0	1 3 0
		Ellon			
		Errol			
		Eyemouth			
	14	Falkirk	14 0 0	7 0 0	14 0 0
		Falkirk, New			
632	2	Falkland	2 0 0	5 0 0	2 0 0
		Fettercairn			
2000	1	Ferry Porton Craig	1 0 0	6 5 0	1 3 0
581	1	Fochabers	1 0 0	5 0 0	1 2 0
1440	5	Forfar	5 0 0	7 10 0	7 12 6
360	5	Do., new shares	2 10 0	7 10 0	6 10 0
		Fort William			
2000	1	Fraserburgh	0 16 0	5 0 0	0 18 0
800	5	Galashiels	5 0 0	10 0 0	9 0 0
		Gatehouse, n. Fleet			
900	2½	Girvan	2 10 0	6 0 0	2 10 0
5200	25	*Glasgow*	25 0 0	10 0 0	50 0 0
3200	6¼	Do., ¼ shares	6 5 0	10 0 0	12 10 0
1000	25	Do., new shares	25 0 0	7 10 0	38 0 0
3000	10	*Glasgow City and Suburban*	10 0 0	10 0 0	20 0 0
5000	10	Do., new shares	10 0 0	7 10 0	15 0 0
		Grahamston			
190	10	Grangemouth	10 0 0	5 0 0	10 0 0
400	8½	Haddington	8 5 0	7 10 0	11 10 0
		Hamilton			
	5	*Hamilton, New*	5 0 0	4 10 0	6 0 0
300	5	Helensburgh	5 0 0	7 10 0	7 10 0
2000	2	Holywood (Lim.)	2 0 0	7 10 0	3 0 0
1312	1	Huntly	1 0 0	7 10 0	1 5 0
250	5	Inverary	5 0 0	10 0 0	6 12 6
425	1	Inverkeithing	1 0 0	5 0 0	1 0 0
1200	10	*Inverness G.& Wr.*	10 0 0	7 10 0	13 10 0
2400	5	Do., new shares	5 0 0	7 10 0	
		Inverury			
	10	Irvine	10 0 0	10 0 0	14 0 0
	2½	Do.	2 10 0	10 0 0	3 12 6
300	5	Jedburgh	5 0 0	7 10 0	7 10 0
		Johnstone, Paisley			
		Kemesburgh (L.)			
1300	1	Keith	1 0 0	5 0 0	0 11 0
600	5	Kelso	5 0 0	10 0 0	11 0 0
620	2	Kelsyth	2 0 0	5 0 0	2 0 0
950	1	Kennoway	1 0 0	5 0 0	1 1 0
1515	1	Kettle Frcuchie & Kettle Bridge	1 0 0	5 0 0	5 0 0
600	25	Kilmarnock	25 0 0	7 10 0	30 0 0
600	25	Do., new shares	7 10 0	7 10 0	
334	5	Kincardine	5 0 0	5 0 0	4 10 0
		Kinghorn			
		Kingskettle, Fife			
		Kinross			
1200	5	Kirkcaldy	5 0 0	10 0 0	10 10 0
320	5	Kircudbright	5 0 0	5 0 0	5 0 0
997	3	Kirkintulloch	3 0 0	6 13 4	3 7 0
		Kirkwall			
		Kirriemuir			
		Lanark			
3500	1	Lanark Conrs.(L)	1 0 0	7 10 0	1 2 6
		Largo, near Leven			
280	8	Largs	8 0 0	7 10 0	8 10 0
1309	1	Lasswade	1 0 0		
177	5	Lauder	5 0 0	5 0 0	5 0 0
2000	1	Leslie, Fife	1 0 0	7 10 0	1 5 0
618	1	Lesmahago	1 0 0	6 0 0	1 0 0
		Leuchars			
877	5	Leven	5 0 0	10 0 0	7 10 0
100	10	Linlithgow	10 0 0	10 0 0	19 0 0
		Linton			
		Lochee, n. Dundee			
434	5	Lochgilphead(Ld.)	5 0 0	7 0 0	5 10 0
380	5	Lochwinnock	5 0 0	3 10 0	4 0 0
		Macduff			
1200	1	Markinch, Paisley	1 0 0	8 0 0	1 5 0
		Maryhill, n.Glasg.			
282	3	Mauchline	3 0 0	5 0 0	3 0 0
667	5	Maxwll T. & Dumf.	5 0 0	5 0 0	3 to 3½
423	5	Maybole, Ayrshire	5 0 0	4 10 0	5 0 0
		Meigle (L.) £700			
373	2	Melrose	2 0 0	7 10 0	2 10 0
718	2	Mid & East Calder	2 0 0		2 0 0
200	5	Moffat	5 0 0	5 0 0	
120	2½	Do., new shares	2 10 0	5 0 0	
400	20	Montrose	20 0 0	10 0 0	35 0 0
		Muirkirk (L.) £1000			
1000	5	Musselburgh	5 0 0	8 0 0	9 0 0
618	1	Nairn	1 0 0	5 0 0	1 0 0
		Neilston, n. Glasg.			
300	5	Newburgh, Fife	5 0 0	8 0 0	7 0 0
300	1	Do., new shares	1 0 0	8 0 0	
1200	1	Newmilns	1 0 0	7 10 0	1 2 0
		Newport, n. Dundee			
1300	1	Newport, Fife	1 0 0	5 0 0	1 0 0
		Newton-on-Ayre			
107	14½	Newton Stewart	14 10 0	5 0 0	14 10 0
300	5	N. Berwick, N.B.	5 0 0	5 0 0	7 10 0
		N. Queensferry			
243	5	Oban	5 0 0	7 10 0	5 7 6
1000	5	Peebles	5 0 0	6 0 0	5 0 0
500	2½	Do., new shares	2 10 0	6 0 0	2 10 0
1000	25	Perth	25 0 0	5 0 0	25 0 0
3000	5	Perth, New	5 0 0		0 3 0
		Peterhead			
2000	1	Pettenween	1 0 0	6 0 0	1 1 0
2416	1	Polloksbaws	1 0 0	7 10 0	1 5 0
		Port Glasgow			
		Portobello			
		Portsoy			
200	5	Prestonpans	5 0 0	6 0 0	
1594	1	Renton, Dumbrtn.	1 0 0	7 10 0	1 1 6
		Rothes			
1500	1½	Ruthergien	1 6 8	5 0 0	1 6 8
250	12	St. Andrew's	12 0 0	8 6 8	16 10 0
193	12	Do., new shares	12 0 0	8 6 8	16 10 0
400	5	Saltcoats	5 0 0	7 10 0	6 0 0
936	1	Sanquhar	1 0 0	5 0 0	0 15 0
30	1	Do., preference	1 0 0	5 0 0	
400		Selkirk	5 0 0	10 0 0	10 0 0
508	1	South Queensferry	1 0 0	5 0 0	1 0 0
200	5	Stewarton	5 0 0	10 0 0	6 to 6¼
7450	2	Stirling	2 0 0	8 0 0	3 5 0
2500	1	Stonehaven	1 0 0	6 5 0	1 5 0
1110	1	Stonehouse	1 0 0	7 10 0	13s. to 15s.
600	2½	Stornoway	2 10 0	8 0 0	3 10 0
		Stow (Limited)			
500	5	Stranraer	5 0 0	10 0 0	6 13 6
588	2	Strathaven	2 0 0	8 0 0	3 0 0
643	2½	Thurso	2 10 0		2 10 0
		Tillicoultry			
		Turriff			
800	1	Tranent	1 0 0	5 0 0	1 0 0
		Troon			
		Tullibody			
2051	1	Wemyss & Bkhn.	1 0 0	6 0 0	1 0 0
		Wick			
665	5	Wigtown	5 0 0		
		IRELAND.			
1800	1	Antrim (Limited)	1 0 0		1 0 0
		Ardee			
300	10	Armagh (Lim.)	10 0 0	10 0 0	20 2 6
500	5	Athy (Limited)	4 0 0	6 0 0	5 0 0
		Balbriggan £1400			
		Ballycastle			
900	6	Ballymena & Harryville (L.)	6 0 0	8 0 0	6 10 0
184	10	Ballymoney	10 0 0	5 0 0	10 0 0
220	5	Ballynahinch(Ld.)	5 0 0	5 0 0	5 0 0
		Ballyshannon£2000			
		Bangor, Down			
5250	20	*Belfast*	20 0 0	10 0 0	39 0 0
2450	20	Do., new shares	20 0 0	10 0 0	35 to 37
		Boyle (Limited)			
1047	5	Carlow	5 0 0	5 0 0	5 0 0
600	5	Carrickfergus(Ld.)	5 0 0	8 0 0	6 5 0
197	10	Carrickmacross(L.)	10 0 0	5 0 0	10 0 0
300	10	Carrick-on-Suir	10 0 0	6 0 0	10 0 0
228	10	Castleblaney (Ld.)	10 0 0	5 0 0	10 0 0
400	5	Cavan (Limited)	5 0 0		5 0 0
		Clones (L.) £2000			
2000	5	Clonmel Consmrs.	5 0 0	6 0 0	5 0 0
240	5	Comber (Limited)	5 0 0	5 0 0	5 0 0
500	5	Cookstown	5 0 0	5 0 0	
		Coote Hill			
12000	5	Cork Conrs. (Lim.)	5 0 0	8 0 0	7 15 0
6000	5	Do., new shares	4 0 0	8 0 0	6 10 0
		Donaghadee £2000			
608	11	Drogheda	11 0 0	7 0 0	14 10 0
420	5¼	Do., new shares	5 10 0	7 0 0	7 5 0
		Dub. Hib. (*see* U.G.)			
19000	10	*Dublin Alliance*	8 0 0	8 15 0	11 10 0
440	25	Dundalk (Limited)	25 0 0	8 0 0	25 0 0
450	10	Dundrum(Limited)	6 0 0	5 0 0	6 0 0
600	5	Dungannon	5 0 0	5 0 0	6 0 0
871	5	*Downpatrick*	5 0 0	4 0 0	4 0 0
249	10	Ennis (Limited)	10 0 0		11 0 0
240	25	Galway	25 0 0	10 0 0	35 0 0
		Gorey (L.) £2000			
		Holywood (Lim.)			
		Keady			
800	5	Kells (L.) Meath	5 0 0	6 0 0	5 0 0
600	10	Kilkenny (Limited)	10 0 0	8 0 0	12 0 0
		Killarney (L.) £3000			
		Kilrush			
		Kinsale (L.) £2000			
210	10	Larne (Limited)	10 0 0	5 0 0	10 0 0
150	10	Letterkenny (Ld.)	10 0 0	5 0 0	12 10 0
		Limerick (*see* U.G.)			
500	10	Lisburn (Limited)	10 0 0	10 0 0	14 0 0
300	5	Lismore	5 0 0	3 0 0	
100	5	Do., preference	3 0 0	5 0 0	
600	15	Londonderry	15 0 0	6 13 4	21 0 0
		Longford			
540	10	Lurgan	8 0 0	6 0 0	9 0 0
		Mallow			
2191	1	Maryborough(Ld.)	0 5 0		0 5 0
		Midleton			
770	5	Monaghan (Lim.)	5 0 0	4 10 0	5 16 0
2000	10	Navan	5 0 0	6 0 0	4 0 0
		Nenagh			
1400	5	Newry Conrs. (L.)	5 0 0	10 0 0	8 3 0
450	5	Newtownards	5 0 0	7 0 0	6 5 0
200	10	Newtownlimavady	10 0 0	5 0 0	10 0 0
		Omagh	5 0 0	7 10 0	6 0 0
250	20	Portadown	20 0 0	5 0 0	20 0 0
125	20	Portaferry			
500	10	Queenstown	10 0 0	6 0 0	10 0 0
200	10	Do., new shares	5 0 0	6 0 0	5 0 0
		Roscommon £2500			
		Saintfield(L.) £1000			
600	10	Sligo	10 0 0	8 0 0	12 10 0
600	5	Do., new shares	5 0 0	8 0 0	6 5 0
		Tandragee (Lim.)			
		Tuam (L.) £3000			
500	5	Tullamore	5 0 0	6 0 0	5 0 0
240	5	Tullow	5 0 0		5 0 0
		Warrenpoint £3000			
1600	10	*Waterford*	10 0 0	6 0 0	12 0 0
300	10	Wicklow (Lim.)	10 0 0	6 0 0	10 0 0

The Gas-Works in the undermentioned towns belong to private individuals. Those marked * by the purchase of the shares in extinct companies:—

Aldershot. Alford. Ballina. Barking*. Beaufort (Brecon). Beaumaris. Berkeley. Billericay. Bodmin. Broadbottom. Brynmawr. Bungay. Burntisland. Chapel-en-le-Frith. Chard. Clare, Suffolk. Crewe. Crickhowell. Dingwall. Eccleshill, near Leeds. Ellesmere. Enniscorthy. Falmouth. Farsley. Fermoy. Ferry Hill. Fleetwood. Goole. Hadleigh. Halstead. Harleston. Harrow-on-the-Hayle. [Hill. Holbeach. Holt. Hunmanby. King's Langley. Leiston (Suffolk). Lynn. Market Deeping. Milnrow, nr. Manchester. Mold Green, nr. Huddersfield. Nantwich*. Nettlebed. Newport (I. of W.) New Ross. Oakham*. Parsonstown. Penryn. Peterborough. Pontypool. Redditch. Ross. Rhyl. St. Blazey (Cornwall). St. Ives* (Hunts). St. Neots*. Seaham. Sidmouth. Sittingbourne. Southall, Midlsex. Stokesley. Stowmarket. Thirsk. Tipperary. Tiverton*. Waltham Abbey. Wem. Wexford. Whitby*. Whitchurch(Salop). Willington Quay & Howdon.

The Gas-Works belong to Local Boards or to Municipal Corporations, or to Commissioners acting under special Acts of Parliament, in the following towns:—

Abergavenny. Athlone. Ballinasloe. Bethesda, Bangor. Beverley. Birkenhead. Blackpool, & Layton with Warbrick. Bollington (Cheshire). Brighouse. Burnley. Burton-on-Trent. Bury (Lanc.). Carlisle. Cashel. Coleraine. Dalton. Darlington. Devizes. Doncaster. Enniskillen. Great Malvern. Greenock. Halifax. Haverfordwest. Keighley. Knaresborough. Leek. Limerick Corporation Works. Lytham (Lanc.). Macclesfield. Manchester. Middlesborough. Milton (Kent). Newton (Lanc.) Oldham. Paisley. Renfrew. Richmond(Yorks.) Ripon. Rochdale. Rothesay. Salford. Southport. Sowerby Bridge. Spalding. Stockport. Stockton-on-Tees. Strabane. Teignmouth. Tenby. Tralee. Trim (Meath). Tyldesley & Shakerley. Wallasey. Walsall. Wells (Norfolk) Workington. Youghall.

Share List of Water Companies.

See "Share List of Gas Companies" for Gas and Water Companies.

No. of Shares issued.	Amount per Share.	Name of Company.	Amount paid up per Share.	Div. per Cent. per Annum.	Price per Share.
		Airdrie & Coatbrdg	£ s d	£ s d	£ s d
588	1	Alexandria, Dumb	1 0 0		0 2 6
800	25	Ayr	25 0 0	5 0 0	25 0 0
1460	10	Banbury	10 0 0	3 10 0	9 0 0
		Belper			
9600	25	Birmingham	25 0 0	6 10 0	34 0 0
9600	17½	Do., new shares	3 0 0	6 10 0	
6000	10	Blackburn	10 0 0		
		Boston			
		Br. of Earn(L)£450			
		Brighton, Hove, &			
8000	25	Bristol . [Preston	25 0 0	3 2 0	20 to 21
8000	12½	Do., preference	12 10 0	5 0 0	13 2 6
		Broadstairs		4 0 0	
		Brompton and Gillingham			
5000	10	Bury and Radcliffe	10 0 0	2 0 0	10 0 0
1333	15	Do., pref. shares	15 0 0	10 0 0	31 15 0
1333	18	Do., do.	6 0 0	10 0 0	14 0 0
2000	10	Do., do.	5 0 0	4 0 0	5 0 0
2000	10	Do., do.	1 0 0	4 0 0	5 0 0
2500	10	Cambridge	10 0 0	4 10 0	
2500	3	Do.	3 0 0	4 10 0	
	8k.	Cardiff	100 0 0	5 15 0	115 0 0
1500	10	Do.	8 0 0	5 15 0	9 0 0
	10	Carlisle	10 0 0		13 to 14
55625	8k.	Cheltenham	100 0 0	5 5 0	120 0 0
6871/2	25	Do., pref. shares	25 0 0	4 10 0	25 0 0
		Chepstow			
		Chester			
2485	2	Clay Cross	2 0 0	8 0 0	2 16 0
		Colchester			
175	20	Colne, Lancashire	20 0 0	5 0 0	28 0 0
	5	Consett District	4 0 0		4½ to 4¾
		Dartford			
1250	20	Darwen	20 0 0	2 10 0	19 to 19½
1400	5	Deal	5 0 0	7 0 0	6 0 0
1560	25	Derby	25 0 0	10 0 0	50 0 0
400	50	Dudley	50 0 0	1 0 0	20 0 0
250	25	Do., pref. shares	25 0 0	4 10 0	
		Dukinfield			
11600	10	Dundee	10 0 0	5 0 0	11 0 0
2670	5	Dunfermline	5 0 0	2 0 0	2 10 0
	5	Durham	5 0 0		7½ to 7⅝
7360	25	Edinburgh	25 0 0	5 0 0	26 0 0
7360	12½	Do., new shares	12 10 0	5 10 0	16 0 0
7218	6¼	Do., do. ¼ shares	6 5 0	5 0 0	7 0 0
5581	6¼	Do., do. do.	2 10 0	5 0 0	2 15 0
2000	25	Exeter	25 0 0	6 10 0	42 0 0
		Falmouth			
		Folkestone			
		Gosport			
	20	Gravesend&Milton	20 0 0	3 0 0	14 to 16
		Great Grimsby (L)			
1000	5	Greenock (Shaw's Gravitation)	50 0 0	7 0 0	68 to 70
		Guiseley, n. Leeds			
		Harrogate			
		Heywood			
1500	10	Kilmarnock	10 0 0	2 0 0	8 0 0
3200	25	Leicester	25 0 0	4 10 0	27 10 0
120	25	Lewes	25 0 0	6 0 0	26 0 0
		Limerick			
1080	25	Lincoln	25 0 0	7 10 0	38 10 0
		London Comps.—			
47000	10	Berlin	10 0 0	4 10 0	8 to 9
12000	25	Chelsea	25 0 0	5 5 0	28 to 29
975000	Sk.	East London	Stock.	6 0 0	126 to 128
10000	50	Grand Junction	50 0 0	8 0 0	78½ to 79
5840	25	Do., ¼ shares	25 0 0	8 0 0	39¼ to 39½
2160	25	Do., new ¼ sh.	10 0 0	7 10 0	
2310	100	Kent	100 0 0	6 0 0	129 to 131
1460	100	Lambeth	100 0 0	6 0 0	110 to 115
4120	50	Do., new shares	50 0 0	6 0 0	51¼ to 53
		New River		441 6 8	£17,400
1560	100	New River London Bge. Annuities	100 0 0	per sh. 2 10 0	55 0 0
3036	100	Southwark & Vxll.	100 0 0	6 0 0	126 to 128
3036	25	Do., do.	25 0 0	6 0 0	31½ to 33½
1296	100	Do., do.	100 0 0	5 0 0	104 to 106
1296	100	Do. (1867)	85 0 0	4 10 0	106 to 108
12168	61	West Middlesex	61 0 0	9 8 6	110 to 111
				per sh.	
		Do., new shares	6 2 0	4 0 0	9 to 9¼
		Liskeard			
		Maidstone			
		Maldon (Lim.)			
		Margate			
		Matlock			
550	10	Neath	9 0 0	4 10 0	10 10 0
250000*l*	Sk.	Newcastle-on-Tyne (Whittle Dean)	Stock.	5 0 0	84½ to 85½
9600	6¼	Do., pref. do.	5 0 0	5 0 0	5⅛ to 5¼
135	20	Newport, Carisbke.	20 0 0	4 10 0	26 0 0
		Newport, Mon.			
		Newry (L.) £6000.			
2000	10	North Cheshire	10 0 0	7 10 0	13 0 0
1581	10	Do.	2 0 0	7 10 0	2 12 0
	10	North Shields	10 0 0		12 to 12¼
		Norwich			
3600	50	Nottingham	50 0 0	5 0 0	60 10 0
		Pontypridd (Lim.)			
		Poole District (L.)			
8000	10	Portsmouth	10 0 0	6 0 0	
8000	5	Do.	2 10 0	6 0 0	
301	10	Queenstown (L.)	10 0 0	4 0 0	10 0 0
99	10	Do.	2 0 0	4 0 0	2 0 0
100	10	Do., new shares			
400	5	Ramsey, I. of Man	5 0 0		
1500	10	Ramsgate	10 0 0	6 0 0	13 to 13¼
		Reading			
		Richmond, Surrey			
		Rochdale			
		Rothesay(L.) £7000			
		Royston (L.) £2500			
		Saffron Walden(L.)			
		St. Helen's			
		Scarborough			
		Sheffield			
		Shrewsbury			
		Southport			
11184	10	South Staffordsh.	10 0 0		11 17 6
2554	10	Do.	5 0 0		
		Spalding			
21000	5	Staffordshire Potts	5 0 0	6 0 0	7 5 0
		Stockport . [boro'			
1800	12½	Stcktn. & Middles-	12 10 0	6 0 0	
800	12½	Do., A shares	12 10 0	6 0 0	
1591	12½	Do., B shares	7 0 0	6 0 0	
4000	10	Do., C preference	2 0 0	5 0 0	2¾ to 3
26700	5	Sndrland&S.Shlds.	5 0 0	8 0 0	8 17 6
		Tolcross, Lanark			
		Tunbridge Wells			
		Tweedmth(L) £500			
		Wakefield			
3000	10	Warrington	10 0 0	7 10 0	15 5 0
		Wellington, Salop			
		Weston-sup-Mare			
		Weymouth			
		Winchester G.&W.			
		Wirral, Cheshire			
20000	5	Wolverhmptn New	5 0 0	4 0 0	5 0 0
		Yeadon (Limited)			
6000	10	York New Co.	10 0 0	5 0 0	11 12 6

The Water-Works in the undermentioned towns belong to private individuals:—

Campbelltown. Chidwall (Lancaster). Hyde (Cheshire). Knaresborough. St. Leonard's. Stamford.

The Water-Works belong to Local Boards of Health, Municipal Corporations, or Commissioners acting under Special Acts of Parliament, in the following towns:—

Aberdeen. Abergavenny. Aberystwith. Alnwick. Ashby-de-la-Zouch. Ashton-under-Lyne. Baildon, Yorkshire. Barnsley. Bath. Belfast. Bilston. Birkenhead. Bishop's Auckland. Bolton.
Bradford, Yorkshire. Brynmaur, Brecon. Burnley. Bury St. Edmund's. Carmarthen. Chelmsford. Chorley. Cork. Coventry. Croydon. Darlington. Dartmouth. Dorchester. Dover.
Dublin. Dumfries. East Stonehouse. Ely. Epsom, Surrey. Fareham, Hants. Glasgow. Gloucester. Greenock. Halifax. Hastings. Haverfordwest. Haworth, Yorkshire. Huddersfield.
Hull. Ilfracombe, Devon. Keighley. King's Lynn. Kirkealdy. Knighton, Radnor. Lancaster. Leamington. Leeds. Leek. Leith. Liverpool. Llandilo. Llanelly.
Lytham. Macclesfield. Maidstone. Manchester. Merthyr Tydvl.. Montrose. Nantwich, Cheshire. Oldham. Oxford. Paisley. Pembroke. Penrith. Penzance. Perth.
Peterhead. Pontefract. Poole. Port Glasgow. Preston. [ness. Pultneytown, Caithness. Rotherham. Rugby. Salford. Salisbury. Sheerness. Shipley. Southampton. Stirling.
Stroud. Swansea. Teignmouth. Tormoham. Warwick. Welchpool. West Cowes. Whitby. Whitehaven. Wigan. Windhill, Yorkshire. Wirksworth. Worcester.

Advertisements.

PRIZE MEDALS, INTERNATIONAL EXHIBITION, 1862.

ONLY MEDAL AWARDED IN CLASS X. FOR

GAS-MEASURING INSTRUMENTS,

"For Ingenuity, Completeness, and Efficiency of Apparatus used in Measuring Gas; and for Excellence of Material and Workmanship;"

Also, PRIZE MEDAL, Class XXXI., "For Superiority of Construction and Workmanship."

GEORGE GLOVER & CO.'S

IMPROVED DRY GAS-METERS,

WARRANTED TO MEASURE CORRECTLY AND NOT TO VARY.

The "Sales of Gas Act" has rendered a far higher degree of accuracy in Meters than has been generally attained hitherto indispensable. This necessity Messrs. Geo. Glover & Co. are fully prepared to meet. In the Manufacture of their Meter the same high standard of accuracy, and the same principles of construction adopted in the Manufacture of the National Standard Gasholders, which the Astronomer Royal, in his Report to the Lords Commissioners of Her Majesty's Treasury, pronounced "*as accurate as it is possible for human skill to make them*," are strictly adhered to.

Messrs. Geo. Glover & Co. keep in stock Meters from One Light to Two Hundred Lights, and make them to order of any size, at prices lower than Wet Meters, and as moderate as any in the market. They maintain them for Five Years in good working order, within the requirements of the Act, free of cost to the purchaser; and, for a longer period, at a much lower cost than that at which Wet Meters can be maintained.

Particulars, Lists of Prices, and Estimates for fitting up Testing Rooms, either in the United Kingdom or Abroad, will be forwarded on application to

RANELAGH WORKS, RANELAGH ROAD, PIMLICO, LONDON, S.W.;

127, BOULEVARD DE MAGENTA, PARIS; AND 15, MARKET STREET, MANCHESTER.

THE

GAS-METER COMPANY, LIMITED,

(LATE CROLL, RAIT, & CO.,)

Beg to intimate that the printed report of the official inspector of Gas-Meters for the City of Manchester for the year ending **1864 shows the following comparison :—**

NEW METERS TESTED.

Of the Gas-Meter Company, Limited . .	Dry . .	1116
	Wet* . .	1292
Total		— 2408
Of George Glover and Co.	Dry	383

* The Unvarying Water-Line Gas-Meter, in regard to which the following extract from said report refers :—"The visiting justices will perceive, from a comparison of the tables now appended with those of last year (viz., 1863), *that there has been a large increase in the number of new wet meters tested, owing to the Gas Committee having substituted the wet for the dry in the case of hired meters.*"

Extract from printed report of the said official inspector for the year ending 1862, shows the following comparison :—

Croll, Rait, and Co., per centage of error on the number tested . . 8·671
George Glover and Co. „ „ „ . . 22·727

SHREWSBURY GASLIGHT COMPANY.

WANTED immediately, a Person of experience, to undertake the duties of METER INSPECTOR. He will have to receive, deliver, and estimate the value of fittings, and render such assistance in the Office as may be necessary.

Applications, stating age and salary required, with testimonials, to be sent in on or before July 16 inst.

S. B. DARWIN,
Secretary and Manager.

WANTED, a Gas-Maker for small Works. Wages 15s. a week; house, coals, and gas provided.

Apply to Mr. CHARLES COOK, Southminster, ESSEX.

WANTED, an efficient Gasfitter. Also a MAN to fix and repair Meters, wet and dry.

Apply by letter, stating wages required, with reference, to the MANAGER, Gas-Works, FALMOUTH.

CATHELS'S Patent Four-Way Disc GAS-VALVES, applied to Purifiers, Gasholders, or other apparatus, save from ONE-HALF to TWO-THIRDS the number of ordinary Valves and Connexions. They are simple, strong, and durable; and having no ground faces or rubbing surfaces, cannot get set fast however long they may remain unmoved. The direction in which the Gas is passing can also be seen at a glance.

Descriptive Circular, Prices, &c., furnished on application to the Manufacturers, Messrs. GUEST and CHRIMES, ROTHERHAM.

GAS TAR AND AMMONIACAL LIQUOR FOR SALE.

THE Directors of the Dudley Gas Company invite TENDERS for the surplus Tar and Ammoniacal Liquor to be produced at their Works for one year, ending June 30, 1867.

The quantity of tar will be about 40,000 gallons, and liquor, 150,000 gallons.

Tenders to be sent in not later than the 17th inst.

The Directors do not bind themselves to accept the highest or any tender.

Gas-Works, Dudley, July 4, 1866.

TO TAR DISTILLERS, &c.

THE Gas Committee of the Middles- brough Local Board are prepared to receive TENDERS for the TAR made on their Works for the ensuing twelve months.

The tenders to state price per ton, either F. O. B. or F. O. Rails, in purchaser's casks or tanks at Middlesbrough; and to be delivered to the undersigned not later than July 31, 1866.

By order of Gas Committee,

JOHN DUNNING, Manager.

WANTED, an active, steady Man, accustomed to the laying of main and service pipes, fixing, surveying, and watering of meters, &c. One who can do a little at smith-work preferred.

Wages 20s. per week to commence.

Apply, with references or testimonials, to the MANAGER, the Ayr Gas Company, Ayr, N.B.

Ayr, July 4, 1866.

FOR SALE, a 6-in. Centre Valve, complete, nearly new; 2 9-ft. lengths of 12-in. Hydraulic Main; 12 3-in. H and Dip Pipes; Hydraulic Valve, with 4-in. connexions, for two purifiers; 4 cast-iron Columns for 8 ft. deep gasholder. Sold on account of enlargement of works.

Apply to Mr. J. H. MASON, NEWBURY.

TO GAS COMPANIES AND ENGINEERS.

TO be Disposed of, by the Falmouth Gas, Coal, and Coke Company, Limited, a Cast-Iron GASOMETER-TANK, 45 ft. diameter by 14 ft. deep, in excellent condition—estimated weight about 78 tons; together with the bolts and nuts, belt-hoops, &c., belonging thereto. Now lying at Penryn, very convenient for shipment or delivery by railway.

Also with the above, or separately, the Framing and Angle Iron Curbs for a telescope gasholder to suit the above tank. Also the pulleys, chains, guide-wheels, bars, &c.

Application to be made to Mr. W. WARN, Secretary to the Company, Falmouth, Cornwall.

Dated Falmouth, June 23, 1866.

THE Kettering Gaslight and Coke Company are open to receive OFFERS for the sale of 80,000 gallons of TAR, delivered at the Kettering Station of the Midland Railway.

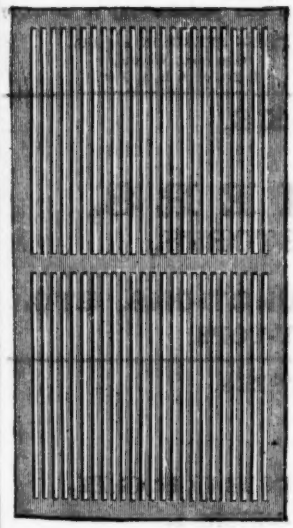
Kettering July 3, 1866.

GARSIDE'S Registered Tube-Vice and improved Main Drilling Clips may be had from the maker.

For drawings and prices apply to SAMUEL GARSIDE, Gate Field Iron-Works, ASHTON-UNDER-LYNE.

WALKERS'

WOOD SIEVES OR GRIDS FOR PURIFIERS.



No. 1.

These celebrated Grids are used for and UNAFFECTED BY EITHER LIME OR OXIDE, WHICH IS SO DESTRUCTIVE TO IRON GRIDS. They are much cheaper, and VERY MUCH MORE DURABLE than Iron Grids.

DRAWING No. 1

Shows our most firm and durable kind of Wood Grids.

They are made BEVEL IN SECTION FOR KEEPING CLEAN, and for LARGER AREA OF GAS PASSAGE through them.

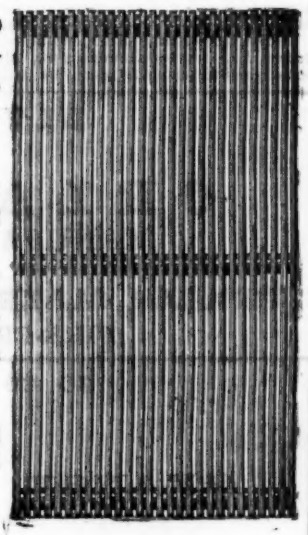
They have outside frames of HARD UNDAMAGEABLE WOOD, which enables them to be COMPRESSED UNDER HEAVY PRESSURE, PROTECTS THEM FROM ROUGH USAGE, and binds them together with STRENGTH AND SOLIDITY.

DRAWING No. 2

Shows our second quality of Wood Grids of a less substantial and cheaper kind. They are made parallel in section, and are suitable for lighter work.

Prices on application to

C. & W. WALKER,
Midland Works, Donnington, near Newport,
SHROPSHIRE; AND
Little Sutton Street, London, E.C.



No. 2.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gasfittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Station-Meters, Governors, Consumers Meters, Gas Lustres, Chandeliers, Brackets, &c., and every description of Gasfittings and Gas Apparatus.

MARTIN'S

LEE MOOR PORCELAIN FIRE-BRICKS,

Containing no Lime, and only ·45 of Oxides, resist the strongest heats, and will last for Gas-Works longer than any others.

Samples and prices sent, and the highest references given, on application to

MARTIN BROTHERS,

ST. AUSTELL, CORNWALL.

WALTER FORD,

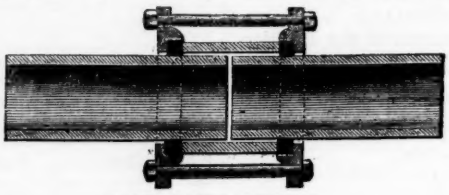
159, GRAY'S INN ROAD, LONDON.

MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.

Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

DR. NORMANDY'S

PATENT PIPE-JOINTS.



SOLE MANUFACTURERS—

A. NORMANDY and CO., Engineers and Ironfounders,

HOLLY BUSH PLACE, BETHNAL GREEN ROAD, LONDON, N.E.

Also Sole Manufacturers of the Patent Marine Aërated Fresh-Water Apparatus, Steam Pumps Steam Winches, &c.

These Joints have been in use nearly three years on gas-mains, and are still perfectly sound. They have also been proved quite sound under a pressure of 680 feet head of water.

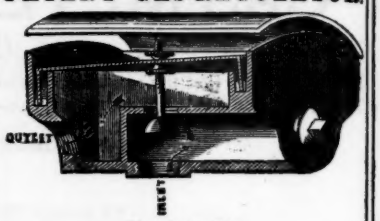
The advantages which these Joints offer are economy, perfect soundness and durability, ease and rapidity of application, use of perfectly plain pipes, so that a tight Joint may be made with cut pipes, even though the ends do not come close together. Any ordinary labourer is capable of securely fixing them.

These Joints are particularly applicable to gas, water, and suction pipes, and remain permanently sound; they are cheaper than the socket-joint, as they save the lead, the gasket, the iron forming the socket (which in a 3-inch main amounts to 10 lbs.), and the fire for melting the lead. There is also considerable saving of time, more than four Joints being made in the time required for making only one of the others, and by unscrewing the bolts, a pipe can be removed and replaced with the greatest facility.

By means of these Joints, which are made of all sizes, pipes made of either wrought or cast iron, copper, lead, tin, earthenware, glass, bitumen, gutta-percha, suction-hose, &c., may be rapidly and soundly united, and taken apart with facility.

ESPLIN'S

PATENT GAS-REGULATOR.



Manufactured by

THOMAS LAMBERT AND SON,

Gas Engineers and Founders,

SHORT STREET, LAMBETH, LONDON.

The object of this Gas-Regulator is to enable any gas consumer to reduce the pressure of the gas, as delivered to him from the works, to the most economical burning-point.

Its advantages over any other regulator are as follows:—

It is more simple in its construction. More sensitive in its operation. Less liable to get out of repair. It requires no more attention than a gas-meter. And is the cheapest regulator yet made.

JAMES OAKES and CO.,

ALFRETON IRON WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water-Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

CAST-IRON Retorts, Socket Pipes, with Syphons and all requisite Connexions, Lamp Columns, Wrought Iron Tubing, Valves, Street Lamps, Sight Holes, Furnace Doors, Ash Pans, Charging and Coke Shovels, Iron Pails and Coke Barrows, Cross Bars, Fire Pots, Pumps, Iron Borings.

PURIFIERS, CONDENSERS, and SCRUBBERS erected complete, or the materials supplied; with every description of goods in use by Gas-Works, in stock, on wholesale prices, at

Mr. LYNCH WHITE'S,

Old Barge Iron Wharf, Upper Ground Street, LONDON.

AUCHINHEATH, Lesmahago, Gas COAL, known in the market for the last fifty years as a first-class gas coal.

JAMES FERGUSON and CO.,

Sole Lessees of the Auchinheath Coal-Field, are prepared to ship the above at Glasgow, Greenock, and Ardrossan, on the west coast of Scotland; and at Granton or Leith, in the Firth of Forth, on the east coast. Also to forward them to any railway-station in Scotland or England.

Price and other particulars may be learned by addressing

JAMES FERGUSON and CO.,

GAS COAL WORKS,

LESMAHAGO.

LIVESEY FIRE-CLAY WORKS,

NEAR BLACKBURN, LANCASHIRE.

ORLANDO BROTHERS,

MANUFACTURER OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

TO CORPORATIONS, GAS ENGINEERS, AND OTHERS.

HENRY ALDER,

GRANGE METER-WORKS, EDINBURGH,

Begs to intimate that he has introduced the manufacture of DRY GAS-METERS in

CAST-IRON CASES.

These Meters are protected by registration under the "Copyright of Designs Act." They are much more durable, and at the same time more easily repaired than those in Tin Cases.

Price list and terms on application.

GAS & GENERAL ENGINEERING OFFICES,
53 FREDERICK STREET, EDINBURGH.

MR. JOHN ROMANS, Civil and Practical Engineer, may be consulted at the above address on all matters pertaining to Gas-Works, Water-Works, and other Engineering questions.

Plans and Specifications Furnished, Works Erected and Repaired, or taken on Lease for a term of years.

Mr. Romans is also agent in Edinburgh for supplying High-Classed Scottish Cannel Coal and Fire-Clay Goods.

FRASER'S PATENT RIBBED CAST-IRON RETORTS are being introduced at the Gas-Works, Derby, Shrewsbury, Portsea, Nottingham, Syston, Whitwick, Barrow-in-Furness, Seaham, Risborough, Leighton, Loughborough, Corwen, Castle Donnington, Kegworth, Royston, Woking, Swadlincote, Rugby, Carlow in Ireland, Stornoway, N.B.; also at Gibraltar and Montreal, &c.

Apply to Mr. A. C. FRASER, Gas-Works, COLCHESTER.

OXIDE OF IRON,
We are prepared to supply, on moderate terms,
HYDRATED PEROXIDE OF IRON (BOG OCHRE),
Same quality as supplied by us to several of the most extensive Gas Companies, and which has given entire satisfaction.

FRANCIS RITCHIE & SONS,
BELFAST.

INTERNATIONAL EXHIBITION,
1862. CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and "HONOURABLE MENTION" for good quality of Fire-Bricks.

WILLIAM STEPHENSON & SONS,
THROCKLEY,
NEWCASTLE-ON-TYNE,

STOURBRIDGE FIRE-CLAY WORKS.

E. BAKER & CO.,
24 WHARF, HARROW ROAD, PADDINGTON, W.

FIRE-BRICKS, LUMPS, SQUARES, and TILES of all dimensions.
GAS-RETORTS always in stock.
GARDEN EDGINGS of various patterns.
ORNAMENTAL BUILDING BRICKS.
GRATE BACKS in various designs.
Contracts entered into to set Retorts, erect Furnaces, &c.
Shipments on the shortest notice.

THOMAS CARR & SON,
MANUFACTURERS OF
FIRE-BRICKS, LUMPS, TILES, RETORTS, &c. &c.
SCOTSWOOD FIRE-BRICK WORKS,
NEAR
BLAYDON-ON-TYNE.

ADDISON POTTER,
WILLINGTON QUAY,
NEAR NEWCASTLE-UPON-TYNE,
Manufacturer of Clay Retorts, Fire-Bricks, and every description of Fire-Clay Goods.

HARRIS and PEARSON,
PROPRIETORS OF
BEST CLASS-HOUSE POT AND CRUCIBLE CLAY
MANUFACTURERS OF
FIRE BRICKS, GAS RETORTS, &C.
AMBLECOTE FIRE CLAY AND BRICK WORKS,
STOURBRIDGE.
Late in the occupation of I. and W. King. Originally J. Pidcock, Esq.
NB A quantity of best Clay Retorts in stock, viz.—Circulars, 14 inches, 15 inches, 16 inches.
D's, 16×12, 15×14, 20×16, 16×18.

HANCOCK'S INDIA-RUBBER GAS-TUBING.
All sizes, from ¼ in. to 4 in. diameter and upwards.
Also,
INDIA-RUBBER BAGS for GAS-MAINS.
WASHERS for GAS and STEAM JOINTS.
VALVES (pure solid Rubber) for STEAM-ENGINES.
PACKING (Roll or Sheet) for STEAM-ENGINES.
STRAPS (Rubber and Canvas) for DRIVING MACHINERY.
HOSE-PIPES to convey HOT or COLD WATER.
COKE-HOSE, made specially for rough usage.
GAUGE GLASS RINGS and WASHERS.
SUCTION and DELIVERY HOSE-PIPES for PUMPS, FIRE-ENGINES, BREWERIES, and FACTORY purposes.
BRASS JETS, STOP-COCKS, SPREADERS, and UNION CONNECTING-JOINTS fitted to ditto.
Illustrated Price-Lists on application.

JAMES LYNE HANCOCK,
Vulcanized India-Rubber Works,
GOSWELL MEWS, AND 266, GOSWELL ROAD,
LONDON, E.C.

Trade Mark. THE MEDAL FOR 1862.
THE ONLY PRIZE MEDAL AWARDED FOR TUBES AND FITTINGS.
CROWN TUBE-WORKS,
WEDNESBURY, STAFFORDSHIRE.
WAREHOUSE—81, UPPER GROUND ST., LONDON.
JAMES RUSSELL & SONS,
Patentees and First Makers of Wrought-Iron Tubes.

W. J. HOLLANDS,
IRON MERCHANT,
31, BANKSIDE, LONDON, S.E.
SOCKET, FLANGE, HOT-WATER PIPES, AND ALL CONNEXIONS; RETORTS, HYDRAULIC MAIN, LAMP-COLUMNS, &c.; AND EVERY DESCRIPTION OF CASTINGS AND WROUGHT-IRON-WORK FOR GAS AND WATER-WORKS, STEAM, AND GENERAL PURPOSES.
N.B.—All goods kept in stock, and supplied at wholesale prices. Estimates given, and orders by post punctually attended to the same day.

BIRTLEY IRON WORKS,
CHESTER-LE-STREET,
DURHAM.
Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
Warehouse in London for Cast-iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.
Office in London, Mr. E. M. PERKINS, 78, Lombard Street.

BELGIAN CLAY RETORTS.
J. SUGG and CO., late ALBERT KELLER, Ghent.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communications, addressed to J. SUGG and Co., GHENT, will receive immediate attention.

ESTABLISHED 1827.
JOHN BEVERLEY and SON,
MARK LANE, LEEDS.
Manufacturers of Patent Metallic Wet Gas-Meters, Station-Meters, Experiment-Meters, Governors, Pressure-Gauges, Syphon-Pumps, &c.
Inventors and sole manufacturers of Beverley's double-cased Gas Cooking Apparatus, unequalled in economy, comfort, and cleanliness.
Meters of any maker altered and put into complete repair, to meet the requirements of the Sale of Gas Act

---

ROBERT MACLAREN and CO.,
EGLINTON FOUNDRY, GLASGOW,
Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

D. BRUCE PEEBLES,
Gas-Meter Manufacturer,
FOUNTAINBRIDGE,
EDINBURGH.

BEST AND HOBSON,
LATE
ROBERT BEST,
100, CHARLOTTE STREET, BIRMINGHAM,
Manufacturers of
CHANDELIERS, PENDANTS, BRACKETS,
Brass and Iron Gas-Fittings, Steam and Water-Cocks &c., &c.
Also,
PATENT WELDED IRON TUBES,
For Gas, Steam, Water, and other purposes.
GAS APPARATUS OF EVERY DESCRIPTION.
High-pressure Water-Valves and Cocks, &c., &c.
Plumbers Brassfoundry,
BRASS, COPPER, COMPOSITION, AND LEAD TUBES.
Works: Birmingham, and Great Bridge, Staffordshire.

ALFRED PENNY, Gas and CONSULTING ENGINEER,
WENLOCK IRON WORKS,
21 & 22, WHARF ROAD, CITY ROAD, LONDON.
Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.
Plans, Specifications, and Estimates prepared.

FREDERICK RICHARDS,
CONSULTING AND GENERAL ENGINEER,
WILMSLOW, CHESHIRE.
Plans, Specifications, and Estimates made for New or the Alteration of existing Gas-Works.
Gas-Works leased, or Estimates given for the Manufacture of Gas per Contract for a term of years.
Manchester Office: 8, Cateaton Street.

GAS COAL.
MESSRS. RICHARD EVANS & CO.,
Haydock Collieries, near St. Helen's, are prepared to SUPPLY their best GAS COAL to Gas Companies on favourable terms.
This Coal is extensively used by some of the largest Gas Companies in the Kingdom.
It produces 9,400 cubic feet of 17-candle power, and yields 13 cwt. of coke per ton.

JAMES NEWTON & SONS,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON, S.E.,
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

B. CARPENTER'S Improved Wood SIEVES for Gas-Purifiers.
Works: 14, John Street, Pentonville Road, LONDON, N.
The above sieves are used by the principal gas companies in London and the country. Their utility, durability, and cheapness combined, render them superior to all others.
Testimonials from gas engineers who have tested their qualities forwarded on application.
All orders punctually attended to, and estimates given if required.

MR. G. W. STEVENSON, C.E., F.G.S., (for the last 10 years Engineer to the Corporation of Halifax), may be consulted upon all matters connected with the construction of gas-works, and the manufacture and supply of gas; also upon the construction of water-works and the supply of water to towns; and also in respect to the sewerage of towns, and sanitary works generally.
Offices, Waterhouse Street, HALIFAX, and 14, Park Street, WESTMINSTER.

W. and H. SIMMONDS,
RETORT-SETTERS,
7B, SOUTH STREET, NEW NORTH ROAD, ISLINGTON, N.
W. and H. Simmonds having had long experience in retort-setting and the erection of tar-furnaces, beg to inform Directors and Managers of gas-works that they undertake to set or repair Retorts, and find labour and materials or labour only, on the most reasonable terms.

J. T. B. PORTER & CO.,
GAS ENGINEERS,
MANUFACTURERS AND CONTRACTORS FOR GAS-WORKS
Of any extent at Home and Abroad,
GOWTS BRIDGE WORKS, LINCOLN,
AND
JOHN STREET, ADELPHI, LONDON, W.C.

SAMUEL CUTLER, Gasholder MAKER and CONTRACTOR
For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS.
PROVIDENCE IRON WORKS,
MILL WALL, POPLAR, LONDON, E.
Main Laying and Gas-Works erected complete.

WALTER MABON & CO.,
Engineers,
ARDWICK IRON-WORKS,
FAIRFIELD STREET, MANCHESTER,
MANUFACTURERS OF
IRON TANKS, GASHOLDERS,
GAS APPARATUS,
PIPES, VALVES, IRON ROOFS,
WROUGHT AND CAST-IRON GIRDERS.
DESIGNS, SPECIFICATIONS, & ESTIMATES FURNISHED.

J. STRACHAN,
CONSULTING GAS ENGINEER,
68, KING'S ROAD, READING,
Having had many years experience in the adjustment and regulation of the supply of gas to public lamps, begs to offer his services to Gas Companies, Corporations, or Boards of Health, on reasonable terms.
Contracts taken for laying mains, general repairs, and extension of gas-works.

NOTICE OF REMOVAL.

THE BUSINESS OF

WILLIAM SUGG,

GAS ENGINEER,

is removed to his New Factory,

VINCENT WORKS, VINCENT STREET,

REGENT STREET, WESTMINSTER.

WATER AND GAS PIPES,

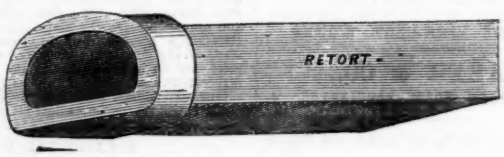
AND EVERY DESCRIPTION OF CASTINGS.

CLARIDGE, NORTH, AND COMPANY,

PHŒNIX FOUNDRY, BILSTON.

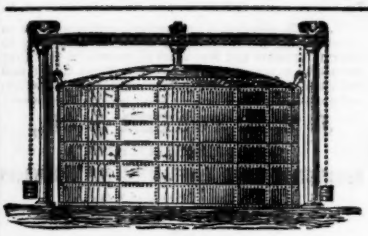
KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Bars, Flues, and Quarries, are all Manufactured of the same quality of Clay.
Every Retort and Brick is branded "King Brothers, Stourbridge."



IMPROVED GAS APPARATUS,

FOR TOWNS, VILLAGES, &c.

INVENTED AND MANUFACTURED BY

W. C. HOLMES & CO.,

WHITESTONE IRON-WORKS, HUDDERSFIELD.

WILL BE SENT ON APPLICATION:—

PLANS, SPECIFICATIONS, and PRICES of GAS APPARATUS;
PLANS, SPECIFICATIONS, and ESTIMATES of the requisite BUILDINGS for each size of Apparatus;
PLANS of the IMPROVED ANNULAR CONDENSERS;
PLANS of the COMBINED PURIFYING APPARATUS, so eminently adapted for Exportation.

LONDON OFFICES—56, GRACECHURCH STREET, CITY.

*** *Please address letters to the Works at Huddersfield.*

WILLIAM INGHAM AND SONS,

WORTLEY FIRE-BRICK AND RETORT WORKS,

Near

Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of
RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY
beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.
The Works are of such magnitude as to ensure the prompt execution of orders to any extent.
Estimates for Setting, or Bricklayers sent when required.
GAS OVENS IN SEGMENTS OF EQUAL QUALITY.
A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.
N.B.—*Export orders continue to have prompt attention.*

TO GAS COMPANIES AND THE TRADE.

NOTICE OF REMOVAL IN CONSEQUENCE OF THE LATE FIRE.

J. DEFRIES AND SONS,

Gas Engineers, and Manufacturers of

CRYSTAL, BRONZED, & ORMOLU Chandeliers;

IMPROVED CRYSTAL STAR & SUN LIGHTS;

VESTIBULES, and every description of Gas-Fittings.

Temporary Show-Rooms:—16 & 17, COMMERCIAL STREET, WHITECHAPEL,

Five Minutes Walk from their late Establishment, 147, HOUNDSDITCH.

J. D. & SONS beg most respectfully to inform Gas Companies and the Trade that their CITY SHOW-ROOMS are now complete with every description of Lighting Mediums, including Registered Designs of Mediæval Gas-Fittings, Crystal, Bronzed, Ormolu, and Electro-Plated Chandeliers, Brackets, Vestibule-Lights, Bronzed and Gilt Statuettes.

Special Designs prepared in perfect accordance with architectural arrangements. Estimates furnished for the Lighting and Fitting up of Theatres, Music-Halls, and Public or Private Buildings with Gas.

GAS-MOONS of the Newest Designs.

The PATENT GAS-REGULATOR and PURIFIER reduced to **6s. 6d. per dozen.** *Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for* 1865-66 *are now complete.*

Works: LONDON and BIRMINGHAM.

The CRYSTAL CEILING, with Ventilating Apparatus, manufactured by J. Defries and Sons for the Strand Music-Hall.

NATURAL OXIDE OF IRON.

Messrs. W. DAWBER & SON,

QUEEN'S DOCK, HULL,

Who with several Gas Companies successfully opposed the prolongation of Mr. F. C. Hills's Patent for the Purification of Gas by Artificial Oxide of Iron, respectfully inform Directors of Gas Companies, Gas Engineers, and all interested in using the cheapest and most effectual material for the Purification of Gas, that they are now prepared to supply the NATURAL OXIDE OF IRON at a price per ton delivered, or to take Contracts by the ton of coal carbonized, receiving back the spent material.

References to several London and provincial Gas Engineers of the highest eminence can be given on application to W. DAWBER & SON, to whom all orders should be addressed.

Queen's Dock, Hull, March 28, 1864.

WARNER'S PATENT ANHYDROUS OXIDE OF IRON

Purifies Gas from Sulphuretted Hydrogen, Carbonic Acid, Bisulphide of Carbon, and Ammonia. The Hydrogen liberated through the decomposition of the Ammonia unites with the excess of carbon, giving increased brilliancy and yield of Gas with less smoke and no Naphthaline.

PRECIPITATED OXIDE OF IRON,

Prepared by the process as patented by Mr. Hills, supplied where preferred.

WARNER'S SILICATE OF IRON PAINT.

The peculiarities and advantages of this Paint are that it will stand extreme heat and damp, and is not affected by the strongest Acid, Sea Water, Sulphuretted Hydrogen, or Ammonia. It is equally well adapted for Iron, Wood, or Cement. Every shade of Colour ground to order. The LIGHT STONE COLOUR will retain its SOFT DELICATE SHADE regardless of the fumes of Gases. IT HAS NO SMELL, and there is an entire absence of deleterious effect.

THE SILICATE OF IRON POWDER,

When boiled up with Tar and Lime, is a very cheap preservative for Iron, Wood, and Felt Roofing, and is recommended for Gasholders which have been coated with Tar.—Price £8 8s. per ton.

A. WARNER, 17, Laurence Pountney Lane, London, E.C.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER.

OFFICES REMOVED TO

19, NORTHUMBERLAND STREET, CHARING CROSS.

Mr. ANDERSON advises Companies on all matters connected with the manufacture of Gas and the construction of Works.

PATENTEE & MANUFACTURER of the following Inventions:—

RETORT SETTINGS, heated by tar without the production of smoke.

STEAM-ENGINES and EXHAUSTERS, separately or combined.

FOUR-WAY VALVES, one of which is equal to three ordinary Valves.

STATION GOVERNORS in which the Gasholder cannot tilt and cause accidents.

A Pamphlet containing Eighteen Illustrations of the foregoing, with letter-press on the construction of Works, post free, 2s. 6d.

"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—ARTIZAN.

THE

GAS-METER COMPANY, LIMITED,

A. ANGUS CROLL, C.E., Chairman.

GEORGE RAIT, MANAGING DIRECTOR. T. G. BARLOW, C.E., CONSULTING ENGINEER.

CROLL'S DRY GAS-METER,

(Invented and Patented in 1844, since which time 200,000 of these Meters have been manufactured by Mr. CROLL,)

Obtained **PRIZE MEDALS** at the EXHIBITIONS of London, 1851, of New York, 1853, and Paris, 1855.

IMPROVED in 1858,

And was awarded at the INTERNATIONAL EXHIBITION of 1862, the PRIZE MEDAL for

"GOOD CONSTRUCTION and SOUND WORKMANSHIP."

Now manufactured by the GAS-METER COMPANY, LIMITED, KINGSLAND ROAD, LONDON; and, for the purpose of obtaining greater accuracy in all its parts, the most perfect machinery has been adopted, "By which the construction of the Meter is much simplified, while its liability to get out of order is diminished." (See report of T. G. BARLOW, Esq., C.E.)

ALEXANDER WRIGHT,

55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.,

MANUFACTURER OF

COMPENSATING & OTHER WET & IMPROVED DRY GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

STATION-METERS & GOVERNORS,

WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, & REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

EXPERIMENTAL TESTING APPARATUS,

Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

"ANALYSIS OF GAS FOR PRACTICAL MEN,"

New and Enlarged Edition, with "Gas-Meter Testing under Sales of Gas Act," p.p. 25 Stamps.

R. LAIDLAW & SON,

GAS ENGINEERS, IRON & BRASS FOUNDERS

Alliance Foundry, 147, East Milton Street, and Barrowfield Iron-Works,

GLASGOW;

AND AT SIMON SQUARE, EDINBURGH;

MANUFACTURERS OF

STATION & CONSUMERS METERS, ALL SIZES;

WROUGHT-IRON TUBES, FOR GAS, WATER, & STEAM; CAST-IRON RETORTS & PIPES,

HYDRAULIC MAINS, CONDENSERS, WASHERS, SCRUBBERS, PURIFIERS, & TANKS.

GASHOLDERS;

GOVERNORS, SLIDE-VALVES, &c.;

WROUGHT & CAST IRON ROOFS & HOUSES.

Contractors for Gas-Works of any Magnitude. *Plans, Specifications, and Estimates furnished.*

LONDON ESTABLISHMENT—190, STRAND.

D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS OF

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT-IRON PIPE BLACK & GALVANIZED. COPPER, TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER

for clearing out Mains, Services, and Interior Fittings—65s. net.

Boyle's Patent Silvered Glass Combination Reflectors and Outside Lanterns.

Sole Manufacturers of Church and Mann's Photometer.

Large Pattern Books with every description of Gas-Fittings, Chandeliers, &c., with complete Book of Prices, 12s.

...IAM BOUGHTON KING (at the office of Clayton and Co., 17, Bouverie Street, Fleet Street); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, July 10, 1866.